OMRON

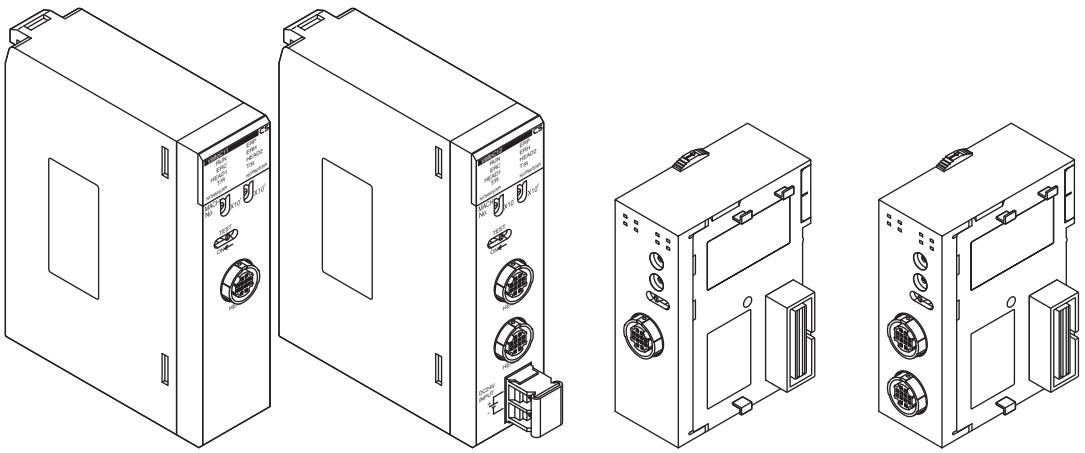
RFID System

# V680 Series

## User's Manual

ID Sensor Units

CS1W-V680C11
CS1W-V680C12
CJ1W-V680C11
CJ1W-V680C12



Man. No.: Z271-E1-03

# Introduction

Thank you for purchasing an ID Sensor Unit for a V680-series RFID System. This manual describes the functions, performance, and application methods needed for optimum use of your V680-series RFID System.

Please observe the following items when using the V680-series RFID System.

- Allow the V680-series RFID System to be installed and operated only by qualified specialist with a sufficient knowledge of electrical systems.
- Read and understand this manual before attempting to use the V680-series RFID System and use the V680-series RFID System correctly.
- Keep this manual in a safe and accessible location so that it is available for reference when required.

| | |
|---|---|
| Introduction | READ AND UNDERSTAND THIS DOCUMENT |
| Section 1 | Features and System Configuration |
| Section 2 | CS-series ID Sensor Units |
| Section 3 | CJ-series ID Sensor Units |
| Section 4 | Data Exchange with the CPU Unit |
| Section 5 | ID Sensor Unit Functions |
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# RFID System

CS1W-V680C11 ID Sensor Unit
CS1W-V680C12 ID Sensor Unit
CJ1W-V680C11 ID Sensor Unit
CJ1W-V680C12 ID Sensor Unit

# User's Manual

## READ AND UNDERSTAND THIS DOCUMENT

Please read and understand this document before using the products. Please consult your OMRON representative if you have any questions or comments.

## WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

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The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this document.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCT IS PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

## PERFORMANCE DATA

Performance data given in this document is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

## CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the product may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

## DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

## ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

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# Safety Precautions

● Signal Words Used in This Manual

The following signal words and symbols are used in this manual to indicate precautions that must be observed to ensure safe use of the V680-series ID Sensor Unit. The precautions provided here contain important safety information. You must observe these precautions.

The following signal words and symbols are used in this manual.

| | |
|---|---|
| ⚠WARNING | Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage. |
| ⚠CAUTION | Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage. |

● Meanings of Alert Symbols

| | |
|---|---|
| | **General Caution**<br>Indicates general cautionary, warning, or danger level information. |
| | **Electrical Shock Caution**<br>Indicates possibility of electric shock under specific conditions. |
| | **General Prohibition**<br>Indicates a general prohibition. |
| | **Disassembly Prohibition**<br>Indicates that disassembly is prohibited to prevent electric shock. |
| | **General Mandatory Action**<br>Indicates a general action that must be performed by the user. |

● Warnings

**⚠WARNING**

Never attempt to disassemble any Units while power is being supplied. Doing so may result in serious electrical shock or electrocution.

Never touch any of the terminals while power is being supplied. Doing so may result in serious electrical shock or electrocution.

Provide safety measures in external circuits, I.e., not in the PLC (CPU Unit including associated Units), in order to ensure safety in the system if an abnormality occurs due to malfunction of the PLC or another external factor affecting the PLC operation. Not doing so may result in serious accidents.

- Emergency stop circuits, interlock circuits, limit cuicuits, and similar safety measures must be provided in external control circuits.
- The PLC will turn OFF all outputs when its self-diagnosis function detects any error or when a severe failure alarm (FALS) instruction is executed. As a countermeasure for such errors, external safety measures must be provided to ensure safety in the system.
- The PLC outputs may remain ON or OFF due to deposition or burning of the output relays or destruction of the output transistors, As a countermeasure for such problems, external safety measures must be provided to ensure safety in the system.

This Product is not designed or rated for ensuring safety of persons. Do not use it for such purposes.

**⚠CAUTION**

Execute online edit only after confirming that no adverse effects will be caused by extending the cycle time. Otherwise, the input signals may not be readable.

# Regulations and Standards

The V680-series ID Sensor Unit conforms to the following international regulations and standards.

1. EMC Standards

The V680-series ID Sensor Unit meets EMC requirements.

EMC Standard: EN 61000-6-2
EN 61000-6-4

Connect to either circuit type (1) or (2) listed below.

(1) Limited Voltage/Current Circuit (Approved under UL 508)

A circuit that uses the secondary windings of an isolation transformer as its power supply and fulfills the following conditions:

- Maximum voltage (with no load): 30 Vrms (42.4 V peak)
  and
- Maximum current: (a) 8 A (including short-circuits) or
  (b) Current limited by a circuit protection device (e.g., fuse) with the ratings listed in the following table.

| No-load voltage (Vrms) | Maximum current rating (A) |
|---|---|
| 0 to 20 | 5.0 |
| Over 20 to 30 | $\frac{100}{\text{Peak voltage}}$ |

(2) A class 2 circuit with a maximum voltage of 30 Vrms (42.4 V peak) that uses a class 2 power supply conforming to UL 1310 or a class 2 transformer conforming to UL 1585 as its power source.

# Precautions for Safe Use

Be sure to observe the following precautions to ensure safe use of the Product.

1. Do not attempt to disassemble, repair, or modify the Product.
2. Tighten the Backplane mounting screws and terminal block screws securely.
3. Be sure to use crimp terminals of the specified size for wiring.
4. If any cable has a locking mechanism, make sure that it has been locked before using the cable.
5. Make sure the power supplied by the DC Power Supply Unit is within the rated power supply voltage (24 VDC +10%/−15%) before using the Product.
6. When using the CS1W-V680C12, make sure the power supplied by the DC power supply for external inputs is within the rated power supply voltage (24 VDC +10%/−15%) before using the Product.
7. Do not connect the power supply in reverse.
8. Use crimp terminals for wiring. Do not connect bare stranded wires directly to terminals.
9. Do not allow water or wires to enter the Product through gaps in the case. Otherwise, fire or electric shock may occur.
10. Turn OFF the power to the Product before attaching or removing an Amplifier or Antenna.
11. If multiple Antennas are mounted near each other, communications performance may decrease due to mutual interference. Refer to information on installing Antenna in the RFID System V680 Series User's Manual for Amplifiers, Antennas, and RF Tags (FRAM) (Cat. No. Z248), V680 Series RFID System Amplifier/RF Tags (EEPROM) User's Manual (Cat. No. Z262), and Heat-resistive RFID System V680 Series User's Manual (Cat. No. Z221) and check to make sure there is no mutual interference.
12. If an error is detected in the Product, immediately stop operation and turn OFF the power supply. Consult with an OMRON representative.
13. Dispose of the Product as industrial waste.
14. Observe all warnings and precautions given in the body of this manual.
15. Do not use thinners, benzenes, acetones, and kerosenes for cleaning.

# Precautions for Correct Use

Always observe the following precautions to prevent operation failure, malfunctions, and adverse effects on performance and equipment.

## 1. Installation Environment

Do not use the Product in the following locations.

- Locations exposed to any flammable, explosive, or corrosive gasses
- Locations exposed to dust, metallic powder, or salts
- Locations not within the specified operating temperature range
- Locations subject to rapid changes in temperature or condensation
- Locations not within the specified operating humidity range
- Locations subject to direct vibration or shock outside the specified ranges
- Locations subject to spray of water, oil, or chemicals

## 2. Installation

- This Product uses a frequency band of 13.56 MHz to communicate with RF Tags. Some transceivers, motors, inverters, switching power supplies, etc., generate electrical noise that will affect these communications. If any of these devices are located in the vicinity of the Product, they may affect communications with RF Tags, and may possibly damage the RF Tags. Prior to using the Product in the vicinity of any of these devices, perform a test to determine whether the Product can be used under the resulting influence.
- Observe the following precautions to minimize the effects of normal noise.
  (1) Ground the ground terminal on the Product and all metal objects in the vicinity of the Product to 100 Ω or less.
  (2) Do not use the Product near high-voltage or high-current lines.
- The Product is not waterproof. Do not use it in an environment where mist is present.
- Do not expose the Product to chemicals that adversely affect the Product materials.
- Use a tightening torque of 0.4 N·m hen mounting the Product.

## 3. Storage

- Locations exposed to any flammable, explosive, or corrosive gasses
- Locations exposed to dust, metallic powder, or salts
- Locations not within the specified operating temperature range
- Locations subject to rapid changes in temperature or condensation
- Locations not within the specified operating humidity range
- Locations subject to direct vibration or shock outside the specified ranges
- Locations subject to spray of water, oil, or chemicals

# Precautions for Users of V600-series ID Sensor Units

## ■ Differences between the V600-series and V680-series ID Sensor Units

The following features were added to the V680-series ID Sensor Units in comparison to the V600-series Units. Functions are upwardly compatible, so V600-series Units can be easily replaced with V680-series Units.

| | |
|---|---|
| Commands | • Read with Error Correction<br>• Write with Error Correction<br>• UID Read<br>• Noise Measurement |
| Communications specifications | • FIFO trigger<br>• FIFO repeat<br>• Multi-access trigger<br>• Multi-access repeat<br>∗ FIFO trigger, FIFO repeat, Multi-access trigger, and Multi-access repeat specification cannot be used for communicating with V680-D1KP□□ RF Tags. |
| DM Area settings | • UID Addition Setting<br>• Write Protection Disable Setting<br>• Antenna Connection Setting (V680-H01)<br>• Results Monitor Output Setting<br>• Test Operation Setting<br>• Run/Test Switching Method Setting |
| Test Operations<br>(Set in the DM Area) | • Distance level measurement<br>• Read/Write speed level measurement<br>• Noise level measurement<br>• Communications success rate measurement |
| CIO Area outputs | Run/Test Bit<br>(Only when using the Run/Test Switching Method Setting is enabled in the DM Area.) |
| CIO Area inputs | • Antenna Error Flag (9C)<br>• ID System Error 1 (79)<br>• ID System Error 2 (7E)<br>• ID System Error 3 (7F)<br>• Error Correction Flag (77)<br>• Results Output Monitor<br>Run Mode: Communications time or noise level<br>Test Mode: Result contents of tests |
| Others | If a command error or data storage area error occurs in a V600-series ID Sensor Unit, the Error End Flag will not be turned ON. With a V680-series ID Sensor Unit, the Error End Flag will be turned ON for these errors. |
| | With a V600-series ID Sensor Unit, command errors and data storage errors are not monitored in the Processing Results Monitor, but a V680-series ID Sensor Unit will monitor them and use an error code of E014. |

# Meanings of Symbols

Indicates particularly important points related to a function, including precautions and application advice.

Indicates page numbers containing relevant information.

Indicates reference to helpful information and explanations for difficult terminology.

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# SECTION 1
# Features and System Configuration


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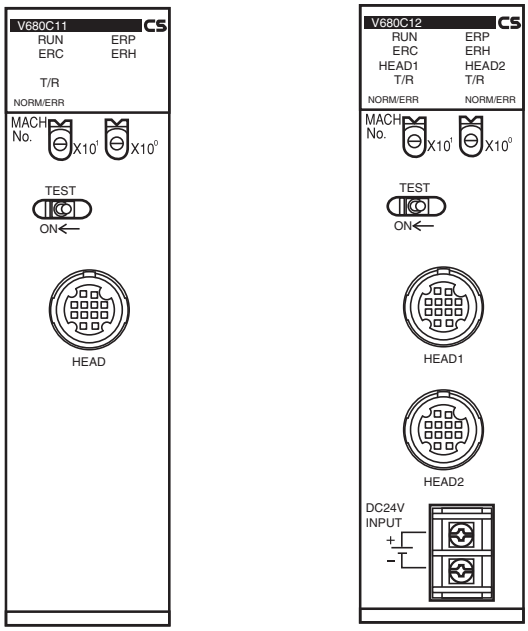
# Outline of Features and Functions



## • SYSMAC CS-series ID Sensor Units

One-channel ID Sensor Unit
(CS1W-V680C11)

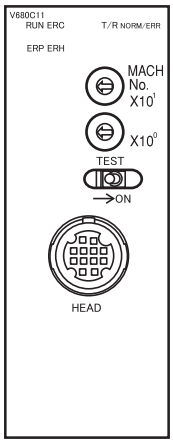
Two-channels ID Sensor Unit
(CS1W-V680C12)



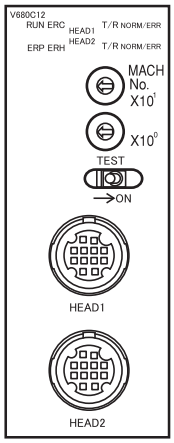

These ID Sensor Units are used in SYSMAC CS-series PLCs to read and write data for V680-series RF Tags. There are two models: a One-channel ID Sensor Unit (CS1W-V680C11) and a Two-channels ID Sensor Unit (CS1W-V680C12).

## • SYSMAC CJ-series ID Sensor Units

One-channel ID Sensor Unit
(CJ1W-V680C11)




Two-channels ID Sensor Unit
(CJ1W-V680C12)




These ID Sensor Units are used in SYSMAC CJ-series PLCs to read and write data for V680-series RF Tags. There are two models: a One-channel ID Sensor Unit (CJ1W-V680C11) and a Two-channels ID Sensor Unit (CJ1W-V680C12).

| | CS1W-V680C11 | CS1W-V680C12 | CJ1W-V680C11 | CJ1W-V680C12 |
|---|---|---|---|---|
| Amplifier/ Antennas | V680 Series (V680-HA63□/V680-H□□) | | | |
| Maximum number of connected Antennas | 1 | 2 | 1 | 2 |
| RF Tags | V680 Series (V680-D□□F□□ or V680-D□□P□□) | | | |
| Commands | Read<br>Write<br>Bit Set<br>Bit Clear<br>Mask Bit Write<br>Calculation Write<br>Data Fill<br>Data Check<br>Number of Writes Control<br>Read with Error Correction<br>Write with Error Correction<br>UID Read<br>Noise Measurement | Read<br>Write<br>Bit Set<br>Bit Clear<br>Mask Bit Write<br>Calculation Write<br>Data Fill<br>Data Check<br>Number of Writes Control<br>Copy<br>Read with Error Correction<br>Write with Error Correction<br>UID Read<br>Noise Measurement | Read<br>Write<br>Bit Set<br>Bit Clear<br>Mask Bit Write<br>Calculation Write<br>Data Fill<br>Data Check<br>Number of Writes Control<br>Read with Error Correction<br>Write with Error Correction<br>UID Read<br>Noise Measurement | Read<br>Write<br>Bit Set<br>Bit Clear<br>Mask Bit Write<br>Calculation Write<br>Data Fill<br>Data Check<br>Number of Writes Control<br>Copy<br>Read with Error Correction<br>Write with Error Correction<br>UID Read<br>Noise Measurement |

- An RFID system consists of an ID Sensor Unit in a CS-series/CJ-series CPU Rack or CS-series/CJ-series Expansion Rack, one or two Antennas connected to the ID Sensor Unit, and RF Tags connected to moving bodies.
- The ID Sensor Unit operates through the Antennas to write data from the CS/CJ-series CPU Unit to the RF Tags and read data from the RF Tags to the CS/CJ-series CPU Unit.

## ■ Differences between Version 1.2 and Pre-Version 1.2

The following functions have been added to version 1.2 in comparison to pre-version 1.2. Functions are upwardly compatible, so pre-version 1.2 can be replaced with version 1.2.

### ▪ CA1D Mode Setting Added for RF Tag Memory

If you are using a V680-CA1D/-CA2D ID Controller, always set the RF Tag memory setting to CA1D Mode. Setting the RF Tag memory setting to CA1D Mode enables reading and writing Heat-resistant RF Tags (V680-D1KP58HTN and V680-D1KP58HT) that were written by the V680-CA1D/-CA2D.

### ▪ New Data Transfer Setting

In addition to cyclically transferring 160 bytes/scan, Intelligent I/O Instructions can now be used to transfer up to 2,048 bytes in one scan.

### ▪ Parameters Added to Data Memory Allocation

DM Area allocations now include a RF Tag memory setting and data transfer setting.

CHECK!

Refer to *DM Area Allocations and Contents* on page 65 for details on the DM Area.

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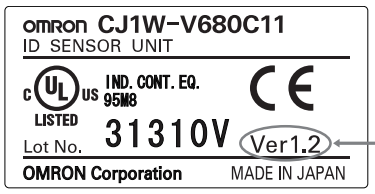
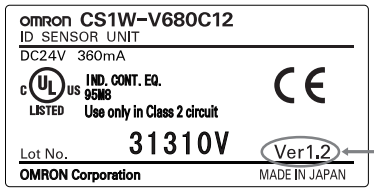
CHECK!

A label on the side of the ID Sensor Unit shows the version for Units with version 1.2 or newer.

• CS1W-V680C1□




• CJ1W-V680C1□




CHECK!

A different memory map may be used when reading or writing Heat-resistant RF Tags that were written by the V680-CA1D/-CA2D from a Reader/Writer that is manufactured by a company other than OMRON. Refer to *Operation When RF Tag Memory Setting Is Set to Standard Mode* in this section.

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# Using Heat-resistive RF Tags (V680-D1KP58HTN and V680-D1KP58HT)



This section provides information for using Heat-resistive RF Tags (V680-D1KP58HTN or V680-D1KP58HT). If you are not using a Heat-resistive RF Tag, set the RF Tag memory setting to Standard Mode.

## Precautions for Saving Data at High Temperatures

If you are using Heat-resistive RF Tags (V680-D1KP58HTN or V680-D1KP58HT), write the data again after saving data at a high temperature even if it is not necessary to change the data. A "high temperature" is one between 110°C and 200°C.

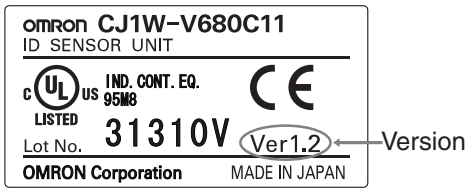
## Using a Controller for a Heat-resistant RFID System (V680-CA1D/-CA2D)

If you are using Heat-resistive RF Tags (V680-D1KP58HTN or V680-D1KP58HT) and also using a V680-CA1D/-CA2D ID Controller, set the RF Tag memory setting of the ID Sensor Unit (version 1.2 or newer) to CA1D Mode.

CHECK!

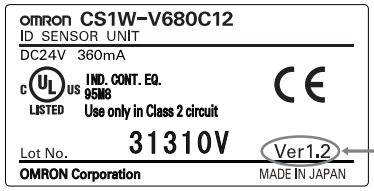
A label on the side of the ID Sensor Unit shows the version for Units with version 1.2 or newer.

• CS1W-V680C1□




Version

• CJ1W-V680C1□




Version

CHECK!

If you are not using the V680-CA1D/-CA2D, the RF Tag memory setting does not need to be changed. Refer to information in *System Configuration*.

### ■ Combining the V680-CA1D/-CA2D with Other V680-series Models

When using other models of Controller with the V680-CA1D/-CA2D, make sure that the version allows setting the RF Tag memory setting to CA1D Mode.

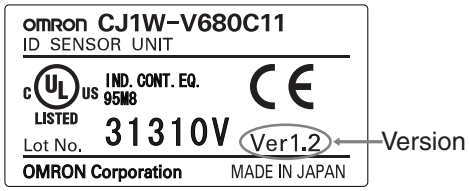
CHECK!

To use the CS/CJ1W-V680C1□, it must be version 1.2 or newer.
To use the V680-CD5D01-V2, it must be version 2.3 or newer.
To use the V680-CH□D, it must be version 1.1 or newer.

CHECK!

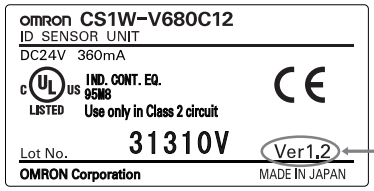
A label on the side of the ID Sensor Unit shows the version for Units with version 1.2 or newer.

• CS1W-V680C1□




Version

• CJ1W-V680C1□




Version

# Precautions when Setting the RF Tag Memory Setting to CA1D Mode

## ■ Applicable RF Tags

Only the V680-D1KP□□ RF Tags can be used when the RF Tag memory setting is set to CA1D Mode.
V680-D□KF□□ RF Tags cannot be used.

### ▪ RF Tags That Can Be Used

| Model |
|---|
| V680-D1KP58HT |
| V680-D1KP58HTN |
| V680-D1KP52MT |
| V680-D1KP52M-BT01 |
| V680-D1KP52M-BT11 |
| V680-D1KP53M |
| V680-D1KP66T |
| V680-D1KP66MT |

### ▪ RF Tags That Cannot Be Used

| Model |
|---|
| V680-D2KF52M |
| V680-D2KF52M-BT01 |
| V680-D2KF52M-BT11 |
| V680-D2KF67 |
| V680-D2KF67M |
| V680-D8KF67 |
| V680-D8KF67M |
| V680-D8KF68 |
| V680-D32KF68 |

## ■ CA1D Mode Setting for RF Tag Memory and Write Protection

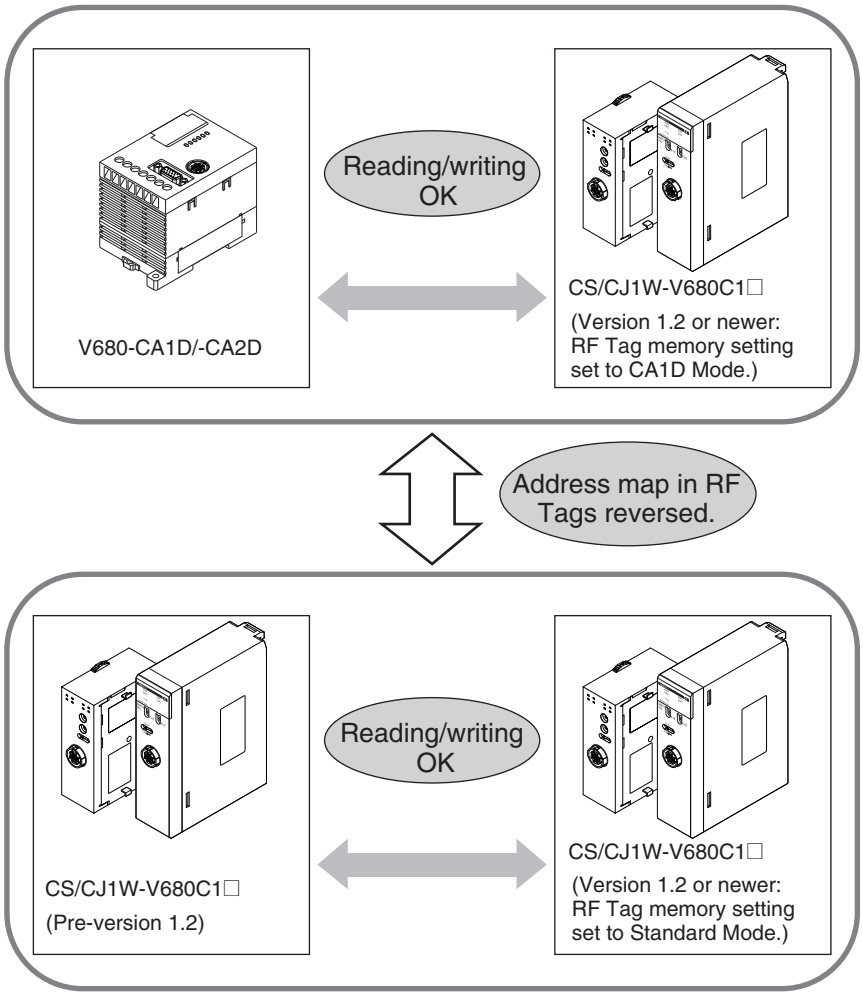
When setting the RF Tag memory setting to CA1D Mode, always disable write protection.
Set word m+2 (Write Protection Setting) in the DM Area to 01 to disable write protection.

CHECK!

Refer to *DM Area Allocations and Contents* on page 65 for details on the DM Area.
p. 65

## ■ Combining ID Sensor Units and ID Controllers

The address maps in the RF Tags for the V680-D1KP□□ (except for the V680-D1KP58HT) are reversed between the V680-CA1D/-CA2D ID Controller and CS/CJ1W-V680C1□ ID Sensor Units (with RF Tag memory setting set to CA1D Mode for version 1.2 or newer), and the V680-CA5D01-V2 (version 2.1 or older) ID Controller and CS/CJ1W-V680C1□ ID Sensor Units (with RF Tag memory setting set to Standard Mode for version 1.2 or newer). Therefore, when you use RF Tags with a V680-CA1D/-CA2D ID Controller, always set the RF Tag memory setting to CA1D Mode in any other models of ID Controller or ID Sensor Units that are used for the same RF Tags.


Reading/writing OK
V680-CA1D/-CA2D
CS/CJ1W-V680C1□
(Version 1.2 or newer: RF Tag memory setting set to CA1D Mode.)
Address map in RF Tags reversed.
Reading/writing OK
CS/CJ1W-V680C1□
(Pre-version 1.2)
CS/CJ1W-V680C1□
(Version 1.2 or newer: RF Tag memory setting set to Standard Mode.)

## ■ Operation When RF Tag Memory Setting Is Set to Standard Mode

When data that was written to a V680-D1KP58HTN RF Tag with the V680-CA1D/-CA2D ID Controller is read from a CS/CJ1W-V680C1□ ID Sensor Unit, the data is read from addresses that are reversed in one-block (eight-byte) units.

If you are going to use an ID Sensor Unit in the same line as a V680-CA1D/-CA2D ID Controller, use an ID Sensor Unit with version 1.2 or newer and set the RF Tag memory setting to CA1D Mode.

| Address | Data written with V680-CA1D/-CA2D | Data read with CS/CJ1W-V680C1□ (pre-version 1.2) or CS/CJ1W-V680C1□ (version 1.2 or newer with RF Tag memory setting set to Standard Mode) |
|---|---|---|
| 0000 hex | 01 hex | 00 hex |
| 0001 hex | 23 hex | 00 hex |
| 0002 hex | 45 hex | 00 hex |
| 0003 hex | 67 hex | 00 hex |
| 0004 hex | 89 hex | 00 hex |
| 0005 hex | AB hex | 00 hex |
| 0006 hex | CD hex | 00 hex |
| 0007 hex | EF hex | 00 hex |
| : | : | : |
| : | : | : |
| 03E0 hex | 00 hex | 01 hex |
| 03E1 hex | 00 hex | 23 hex |
| 03E2 hex | 00 hex | 45 hex |
| 03E3 hex | 00 hex | 67 hex |
| 03E4 hex | 00 hex | 89 hex |
| 03E5 hex | 00 hex | AB hex |
| 03E6 hex | 00 hex | CD hex |
| 03E7 hex | 00 hex | EF hex |

Addresses are reversed by block.

## ■ Operation When RF Tag Memory Setting Is Set to CA1D Mode

If the RF Tag memory setting for the CS/CJ1W-V680C1□ (version 1.2 or newer) is set to CA1D Mode, data is read from or written to addresses that are reversed in block units for the V680-D1KP□□ (except for the V680-D1KP58HT) in the same way as for the V680-CA1D/-CA2D. Therefore, data can be read from the same addresses as those to which data was written by the V680-CA1D/-CA2D.

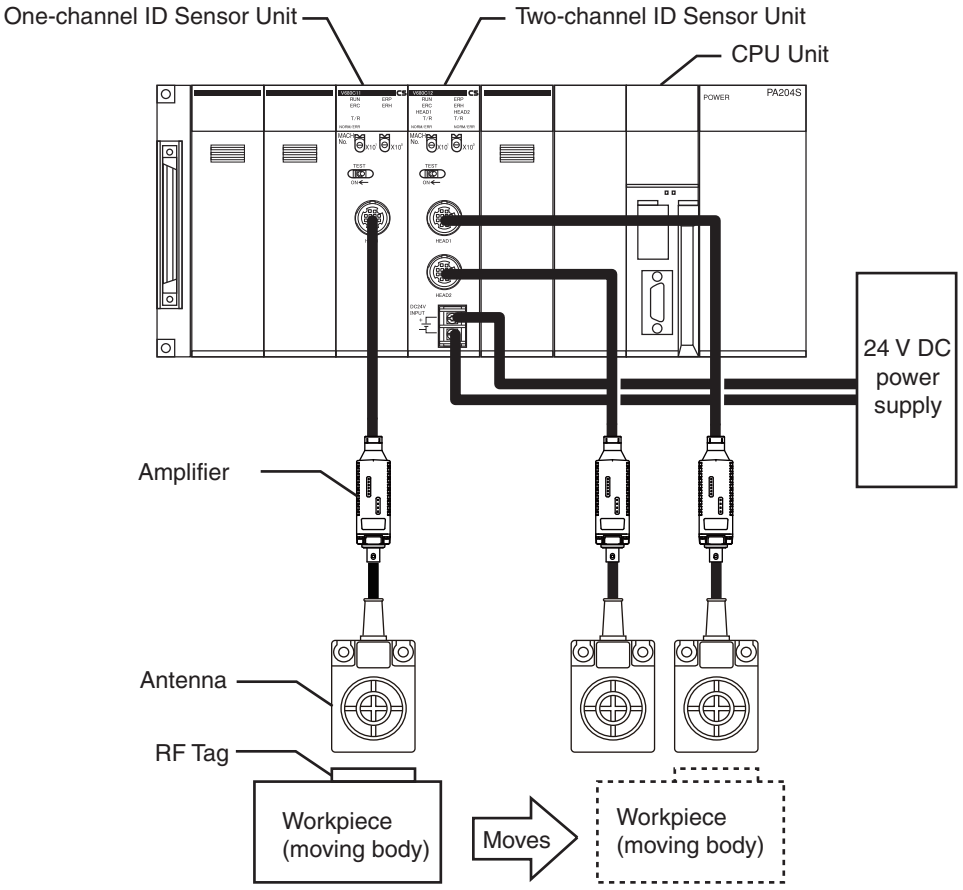
| Address | Data written with V680-CA1D/-CA2D | Data read with CS/CJ1W-V680C1□ (version 1.2 or newer with RF Tag memory setting set to CA1D Mode) |
|---|---|---|
| 0000 hex | 01 hex | 01 hex |
| 0001 hex | 23 hex | 23 hex |
| 0002 hex | 45 hex | 45 hex |
| 0003 hex | 67 hex | 67 hex |
| 0004 hex | 89 hex | 89 hex |
| 0005 hex | AB hex | AB hex |
| 0006 hex | CD hex | CD hex |
| 0007 hex | EF hex | EF hex |
| : | : | : |
| : | : | : |
| 03E0 hex | 00 hex | 00 hex |
| 03E1 hex | 00 hex | 00 hex |
| 03E2 hex | 00 hex | 00 hex |
| 03E3 hex | 00 hex | 00 hex |
| 03E4 hex | 00 hex | 00 hex |
| 03E5 hex | 00 hex | 00 hex |
| 03E6 hex | 00 hex | 00 hex |
| 03E7 hex | 00 hex | 00 hex |

Same as data read with V680-CA1D/-CA2D.

# System Configuration

## Basic System Configuration

### ■ CS-series PLCs




**Note:** The above example uses one One-channel ID Sensor Unit (CS1W-V680C11) and one Two-channels ID Sensor Unit (CS1W-V680C12).

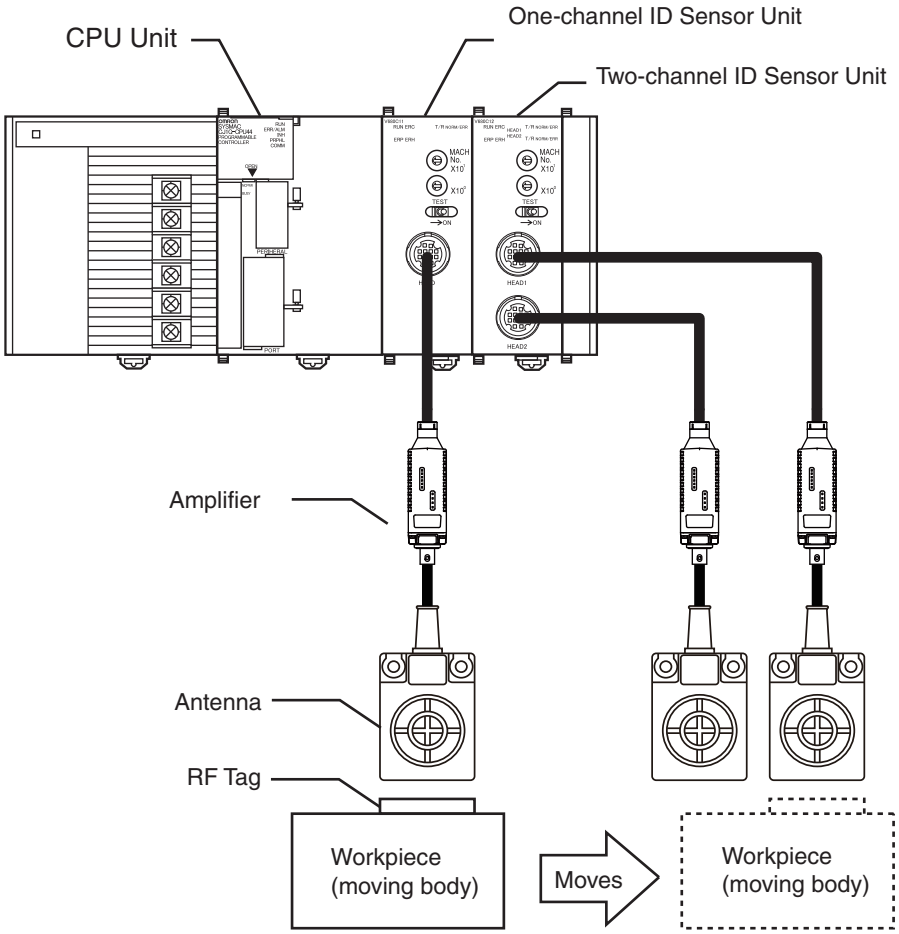
CHECK!

The V680-H01 Antenna can be connected to only the One-channel ID Sensor Unit (CS1W-V680C11). It cannot be connected to the Two-channels ID Sensor Unit (CS1W-V680C12).

CHECK!

For details on Antennas, Amplifiers, and RF Tags, refer to the following manuals:
*RFID System V680 Series User's Manual for Amplifiers, Antennas, and RF Tags (FRAM)* (Cat. No. Z248),
*V680 Series RFID System Amplifier/RF Tags (EEPROM) User's Manual* (Cat. No. Z262), and
*Heat-resistive RFID System V680 Series User's Manual* (Cat. No. Z221).

## ■ CJ-series PLCs




**Note:** The above example uses one One-channel ID Sensor Unit (CJ1W-V680C11) and one Two-channels ID Sensor Unit (CJ1W-V680C12).

CHECK!

The V680-H01 Antenna can be connected to only the One-channel ID Sensor Unit (CJ1W-V680C11). It cannot be connected to the Two-channels ID Sensor Unit (CJ1W-V680C12).

CHECK!

For details on Antennas, Amplifiers, and RF Tags, refer to the following manuals:
*RFID System V680 Series User's Manual for Amplifiers, Antennas, and RF Tags (FRAM)* (Cat. No. Z248),
*V680 Series RFID System Amplifier/RF Tags (EEPROM) User's Manual* (Cat. No. Z262), and
*Heat-resistive RFID System V680 Series User's Manual* (Cat. No. Z221).

# Mounting Restrictions

## ■ CS-series PLCs

CS-series ID Sensor Units are classified as CS-series Special I/O Units.

- These Units can be mounted to a CS-series CPU Rack or CS-series Expansion Rack.
- The number of Units per CPU Rack or Expansion Rack depends on the maximum supply current of the Power Supply Unit and current consumption of other Units on the Rack.

The following table lists the maximum number of Units per Rack when only ID Sensor Units are mounted.

| Power Supply Unit | CS1W-V680C11 | | CS1W-V680C12 |
|---|---|---|---|
| | V680-HA63□ Amplifier connected | V680-H01 Antenna connected | V680-HA63□ Amplifier connected |
| C200HW-PA204<br>C200HW-PA204S<br>C200HW-PA204R<br>C200HW-PD204 | 5 | 2 | 10 |
| C200HW-PA209R | 9 | 4 | 10 |

CHECK!

The V680-H01 Antenna can be connected to only the One-channel ID Sensor Unit (CS1W-V680C11).
It cannot be connected to the Two-channels ID Sensor Unit (CS1W-V680C12).

## ■ CJ-series PLCs

CJ-series ID Sensor Units are classified as CJ-series Special I/O Units.

- These Units can be mounted to a CJ-series CPU Rack or CJ-series Expansion Rack.
- The number of Units per CPU Rack or Expansion Rack depends on the maximum supply current of the Power Supply Unit and current consumption of other Units on the Rack.

The following table lists the maximum number of Units per Rack when only ID Sensor Units are mounted.

| Power Supply Unit | CJ1W-V680C11 | | CJ1W-V680C12 |
|---|---|---|---|
| | V680-HA63□ Amplifier connected | V680-H01Antenna connected | V680-HA63□ Amplifier connected |
| CJ1W-PA205R | 4 | 2 | 2 |
| CJ1W-PA202 | 2 | 1 | 1 |

CHECK!

The V680-H01 Antenna can be connected to only the One-channel ID Sensor Unit (CJ1W-V680C11).
It cannot be connected to the Two-channels ID Sensor Unit (CJ1W-V680C12).

CHECK!

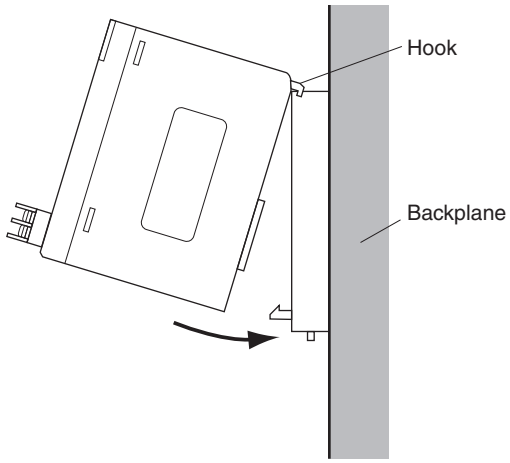
The I/O words allocated to Special I/O Units are determined by the setting of the unit number switches on the front of the Unit. They are not affected by the slots (positions) in which the Units are mounted.

# Mounting Units

## ■ CS-series PLCs

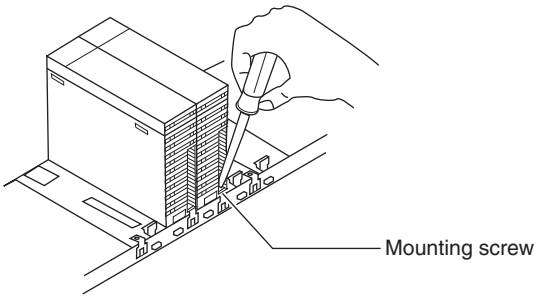
Use the following procedure to mount an ID Sensor Unit to the Backplane.

**1.** Lock the top of the ID Sensor Unit into the slot on the Backplane.



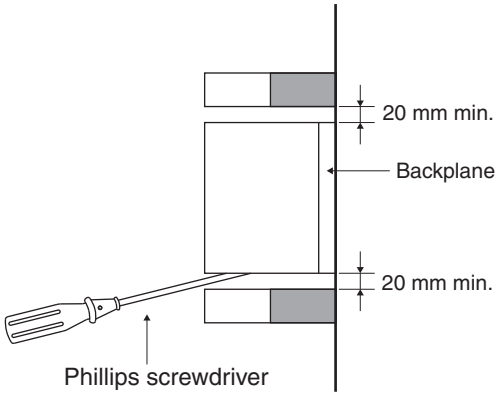

**2.** Rotate the Unit downwards as shown in the following diagram. While making sure to align the Unit connector properly with the connectors on the Backplane, and then tighten the mounting screws securely to a tightening torque of 0.4 N·m

**3.** To remove the Unit, first loosen the mounting screws using a Phillips screwdriver.



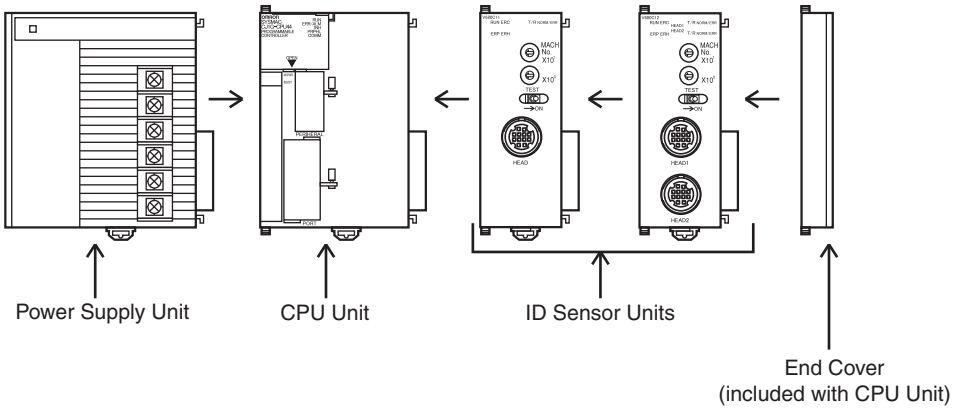

CHECK!

Leave enough space below each Rack, as shown in the following diagram, for mounting and removing the Units.



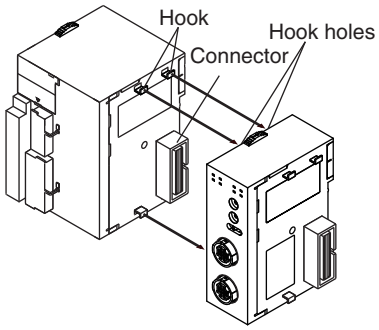
## ■ CJ-series PLCs

ID Sensor Units are connected as I/O Units in the system configuration, as shown below.

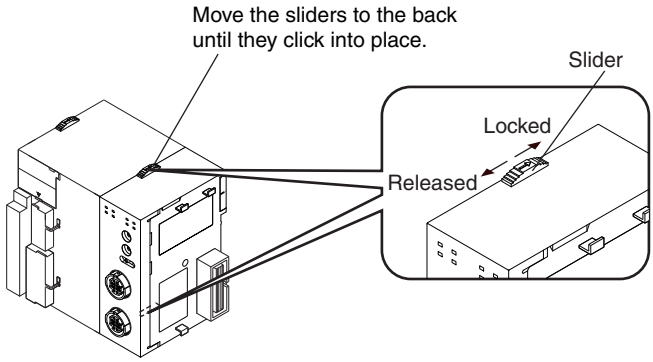



Use the following procedure to connect an ID Sensor Unit.

**1.** Align the connectors and press in firmly on the Units to connect them completely.




**2.** Move the yellow sliders on the top and bottom of the Unit to the lock position to secure the Units. The sliders should click into place.




**3.** Attach an End Cover to the Unit on the right end of the Rack.

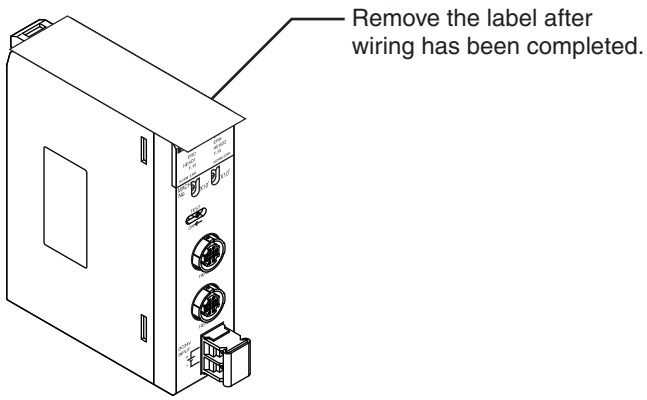
CHECK!

The CJ-series PLC may not operate properly if the sliders are not locked firmly into place.

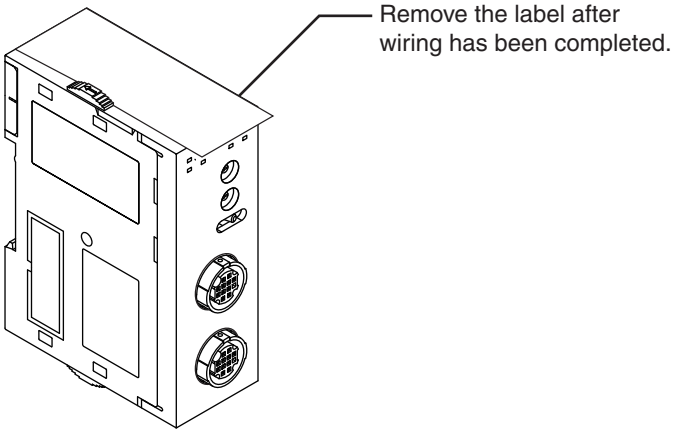
## Unit Handling Precautions

- Be sure to turn OFF the power supply to the PLC before installing or disconnecting Units, or connecting lines.
- To reduce the influence of electrical noise, wire input and output lines in separate ducts from high-voltage and power lines.
- When wiring a Unit, leave the label in place on the top of the Unit to prevent wire clippings or other materials from getting inside the Unit. When wiring has been completed, remove the label to ensure proper heat dissipation.

### ■ CS-series PLCs




### ■ CJ-series PLCs



# Functions by Application



| Application | Function | Reference |
|---|---|---|
| Performing communications tests with RF Tags without programming the CPU Unit | Test Mode | p. 78 |
| Adjusting communications timing with RF Tags<br>Examples:<br>• Communicating with RF Tags stopped in front of the Antenna<br>• Communicating with RF Tags passing by the Antenna | Communications Specifications | p. 85 |
| Protecting RF Tag memory from being overwritten by incorrect data | Write Protection | p. 101 |
| Managing RF Tag life | RF Tag Service Life Check | p. 108 |
| Checking the suitability of RF Tag memory | RF Tag Memory Check | p. 112 |
| Checking RF Tag memory and correcting one-bit errors. | RF Tag Memory Error Correction | p. 114 |

# SECTION 2
# CS-series ID Sensor Units


| | |
|---|---|
| Specifications | 30 |
| Operating Procedure | 32 |
| Part Names and Functions | 38 |
| Connections and Wiring | 41 |

# Specifications

## General Specifications

General specifications conform to those of SYSMAC CS-series Special I/O Units.

## Performance Specifications



| | CS1W-V680C11 | CS1W-V680C12 |
|---|---|---|
| Unit classification | Special I/O Unit | |
| Influence on CPU Unit's cycle time | 0.15 ms | 0.3 ms |
| External power supply | --- | 24 VDC +10%/-15%, 360 mA |
| Internal current consumption | V680-HA63□ Amplifier connected: 5 VDC, 260 mA<br>24 VDC, 125 mA<br>V680-H01 Antenna connected: 5 VDC, 260 mA<br>24 VDC, 280 mA | 5 VDC, 320 mA<br>24 VDC, 0 mA |
| Dimensions | 35 x 130 x 101 mm (W x H x D) | |
| Weight | 180 g max. | 300 g max. |
| Mounting location | CS-series CPU Rack or CS-series Expansion Rack<br>(Cannot be mounted to C200H Expansion I/O Racks or SYSMAC BUS Slave Racks.) | |
| No. of Units per Rack | V680-HA63□ Amplifier connected: 5 per Rack<br>V680-H01Antenna connected: 2 per Rack<br>(See note 1.) | 10 per Rack<br>(See note. 1) |
| Connectable Antennas (See note 2.) | V680-series Amplifiers (V680-HA63□)<br>V680-series Antennas (V680-H□□)<br>One channel | V680-series Amplifiers (V680-HA63□)<br>V680-series Antennas (V680-H□□)<br>One or two channels |
| Applicable RF Tags | V680-series RF Tags (V680-D□□) | |
| No. of allocated unit numbers | 1 | 2 |
| No. of allocated words | 10 words | 20 words |
| Control protocol | Special protocol | |
| Data exchange methods with CPU Unit | Special I/O Unit Area in CIO Area: CIO 2000 to CIO 2959 / Constant data exchange of 10 words/Unit / CPU Unit to ID Sensor Unit: Unit controls, communications processing specification, data storage area specification | |
| | | ID Sensor Unit to CPU Unit: Unit information, results information, processing results monitor |
| | Special I/O Unit words in DM Area: D20000 to D29599 / 100 words/Unit transferred when power is turned ON or when restarting the Unit / CPU Unit to ID Sensor Unit: System Settings, Auto Wait Time Setting, Write Protection Disable Setting, Antenna Connection Setting, Results Monitor Output, Test Setting, Run/Test Switching Method Setting | |
| Data transfer quantity | 2,048 bytes max. (160 bytes/scan) (See note 3.) | 2,048 bytes max./channel (160 bytes/scan) (See note 3.) |
| Operating modes | Run Mode | |
| | Test Mode: · Communications tests<br>· Distance level measurements<br>· Read speed level measurements<br>· Write speed level measurements<br>· Noise level measurements<br>· Communications success rate measurements | |
| Diagnostic function | (1) CPU watchdog timer<br>(2) Communications error detection with RF Tag<br>(3) Antenna power supply error | |

**Note 1.** "Rack" indicates either the CPU Rack or an Expansion Rack.

**2.** The V680-H01 Antenna can be connected only to the CS1W-V680C11 ID Sensor Unit. It cannot be used with the CS1W-V680C12 ID Sensor Unit.

**3.** If using Intelligent I/O Instructions is specified as the data transfer method, up to 2,048 bytes can be transferred in one scan.

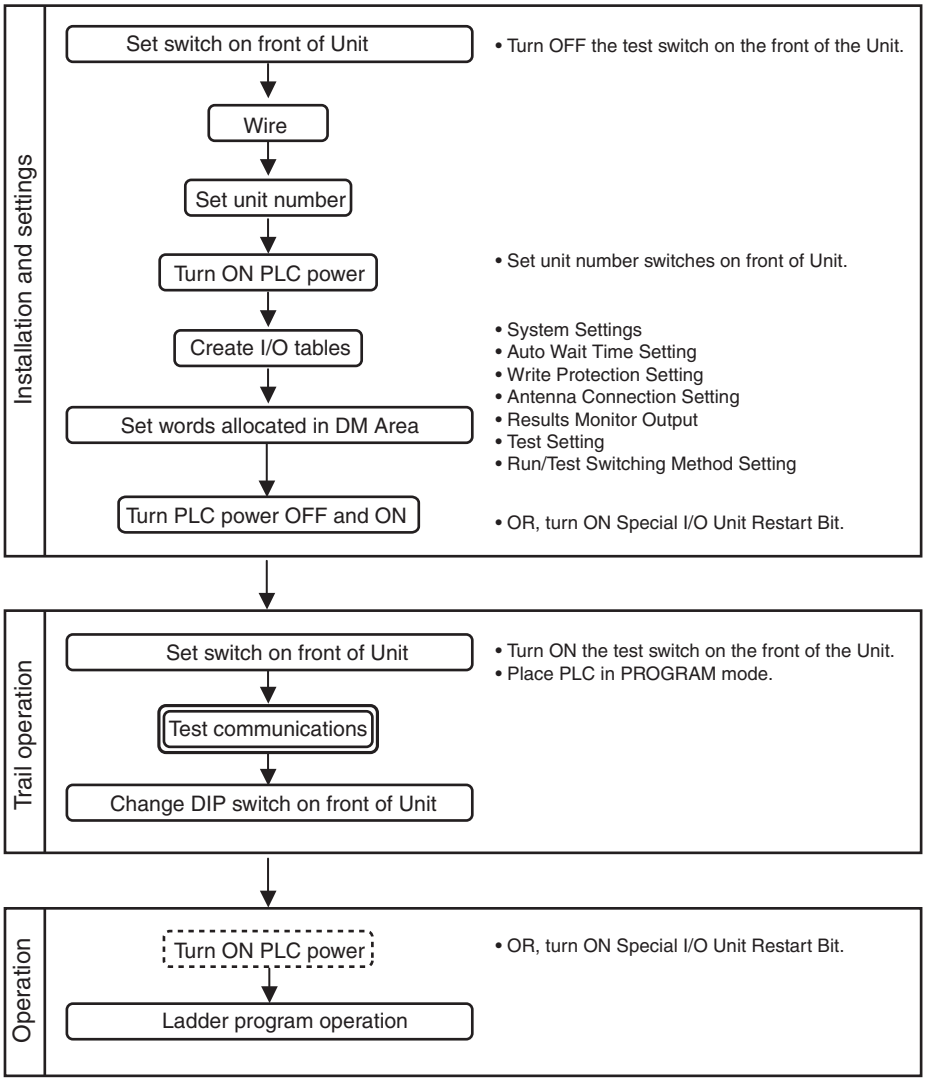
# Communications Specifications

| | CS1W-V680C11 | CS1W-V680C12 |
|---|---|---|
| Communications controls | (1) RF Tag Communications Speed (Normal Mode or High-speed Mode)<br>(2) Write Verification<br>(3) Auto Wait Time Setting<br>(4) UID Addition Setting<br>(5) Write Protection Disable Setting<br>(6) Antenna Connection Setting (One-channel ID Sensor Unit (CS1W-V680C11))<br>(7) Results Monitor Output Setting | |
| Commands | Read<br>Write<br>Bit Set/Bit Clear<br>Mask Bit Write<br>Calculation Write<br>Data Fill<br>Data Check<br>Number of Writes Control<br>Read with Error Correction<br>Write with Error Correction<br>UID Read<br>Noise Measurement | Read<br>Write<br>Bit Set/Bit Clear<br>Mask Bit Write<br>Calculation Write<br>Data Fill<br>Data Check<br>Number of Writes Control<br>Copy<br>Read with Error Correction<br>Write with Error Correction<br>UID Read<br>Noise Measurement |
| Communications specification | Single trigger<br>Single auto<br>Repeat auto<br>FIFO trigger (See note)<br>FIFO repeat (See note)<br>Multi-access trigger (See note)<br>Multi-access repeat (See note) | |

**Note:** FIFO trigger, FIFO repeat, Multi-access trigger, and Multi-access repeat specification cannot be used for communicating with V680-D1KP□□ RF Tags.

# Operating Procedure

The operating procedure for an ID Sensor Unit is shown in the following flowchart.


Installation and settings
Set switch on front of Unit
• Turn OFF the test switch on the front of the Unit.
Wire
Set unit number
Turn ON PLC power
• Set unit number switches on front of Unit.
Create I/O tables
• System Settings
• Auto Wait Time Setting
• Write Protection Setting
• Antenna Connection Setting
• Results Monitor Output
• Test Setting
• Run/Test Switching Method Setting
Set words allocated in DM Area
Turn PLC power OFF and ON
• OR, turn ON Special I/O Unit Restart Bit.
Trail operation
Set switch on front of Unit
• Turn ON the test switch on the front of the Unit.
• Place PLC in PROGRAM mode.
Test communications
Change DIP switch on front of Unit
Operation
Turn ON PLC power
• OR, turn ON Special I/O Unit Restart Bit.
Ladder program operation

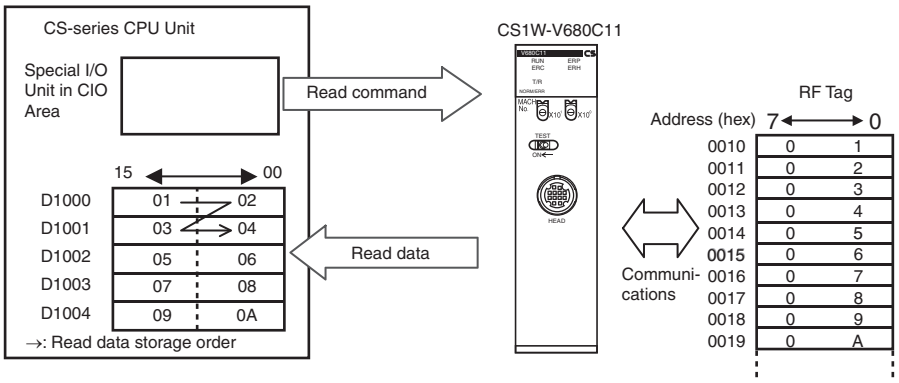
CHECK!

- When using CX-Programmer V3.0 or later with the CS1W-V680C12, "I" will be displayed before addresses for inputs in the ladder diagram and "Q" will be displayed before addresses for outputs for operation data. In the CX-Programmer's I/O Table Window, select SIOU/C200H ASCII Unit (A) and then, from the Enter SIOU Details Window, set the Address per Unit to 2, the Input Words to 3, and the Output Words to 7, and select the Repeat IN/OUT for each Address per Unit option.
- When using CX-Programmer V2.0 or later with the CS1W-V680C11, "I" will be displayed in the ladder diagram before address for inputs and "Q" will be displayed before addresses for outputs for operation data.
- When using the CS1W-V680C12, turn ON the power supply for external inputs at the same time or after the CPU Unit power supply is turned ON.

# Operating Procedure Example

The following is an operating procedure example for the following conditions.

Reading 10 Bytes of Data from RF Tag Address 0010 (Hex) Using a Trigger




## • Special I/O Unit in CIO Area Settings

Unit number: 00

Command: Read

Communications specification: Trigger

Read data storage order: Leftmost → Rightmost

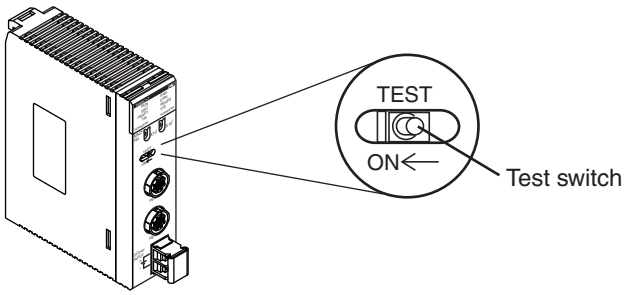
First RF Tag read address: 0010 hex

Number of RF Tag read bytes: 10 bytes

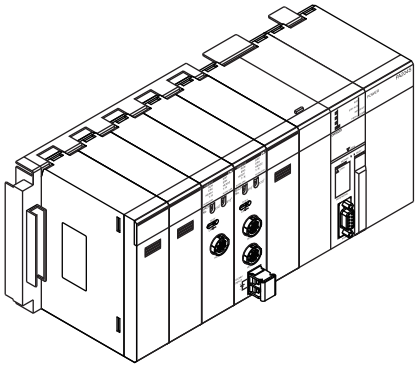
Read data storage destination: D1000 to D1004

## ■ ID Sensor Unit Settings

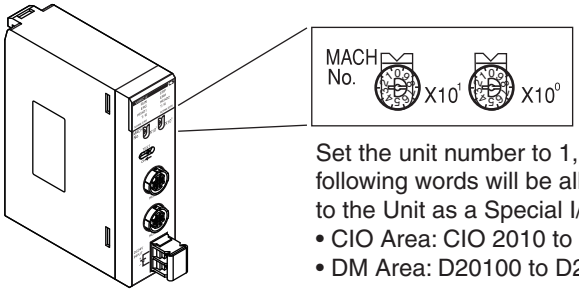
**1.** Test switch (Set on Unit's front panel.)




**2.** Mounting and Installation

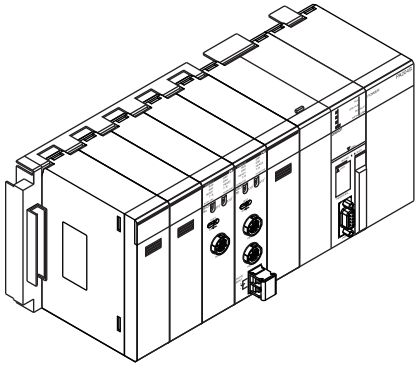


**3.** Unit Number Setting




Set the unit number to 1, and the following words will be allocated to the Unit as a Special I/O Unit.
- CIO Area: CIO 2010 to CIO 2019
- DM Area: D20100 to D20199

**4.** PLC Power Supply ON

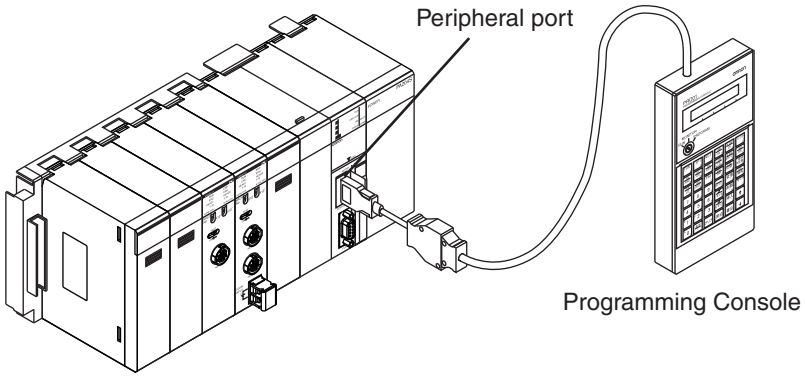



CHECK!

- When using the CS1W-V680C12, turn ON the external input power supply at the same time or after the CPU Unit power supply is turned ON.

## ■ Creating I/O Tables

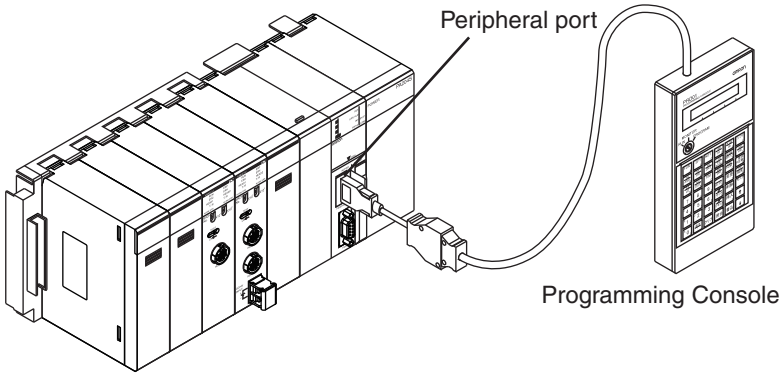
Always create the I/O tables after turning ON the PLC power supply.
The I/O tables can be created from a CS/CJ-series Programming Console or a CX-Programmer (Support Software used to control a PLC, e.g., to create programs or change operating modes).




## ■ Initial Settings

**1.** Make the settings in the words allocated to Special I/O Units in the DM Area.

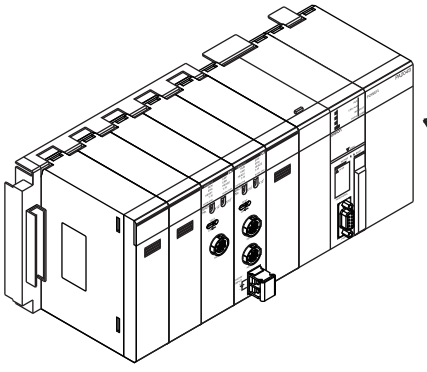
CHECK! For information on setting the Special I/O Unit words in the DM Area, refer to *Parameter Settings in DM Area* on page 93.
p. 93



First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

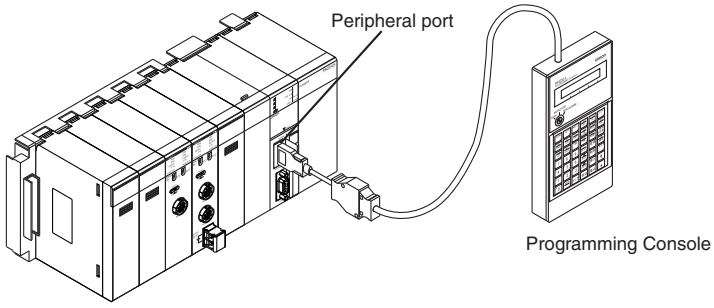
| DM address | Contents | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 0 0 0 0 | UID Addition<br>0: Disabled<br>1: Enabled | | | | Test Mode Disable<br>0: Enabled<br>1: Disabled | | | | Write Verification<br>0: Verification<br>1: No verification | | | | Communications Speed<br>0: Normal<br>1: High-speed | | | |
| D20001 | 0 0 0 0 | Auto Wait Time<br>Setting range: 0000 to 9999 (×0.1 s)<br>Factory setting: 0000 (infinite) | | | | | | | | | | | | | | | |
| D20002 | 0 0 0 0 | Not used | | | | Not used | | | | Write Protection Disable<br>00: V680 method<br>01: Disabled<br>00: V600 method | | | | | | | |
| D20003 | 0 0 0 0 | Not used | | | | Not used | | | | Not used | | | | Antenna Connection<br>0: Standard Antenna<br>1: V680-H01 | | | |
| D20004 | 0 0 0 0 | Not used | | | | Not used | | | | Not used | | | | Results Monitor Output<br>0: Communications time<br>1: Noise level | | | |
| D20005 to D20049 | 0 0 0 0 | Not used | | | | | | | | | | | | | | | |
| D20050 | 0 0 0 0 | Test Operation<br>00: Communications test<br>A0: Distance level<br>B0: Read speed level<br>B1: Write speed level<br>C0: Noise level<br>C1: Communications success rate<br>C2: Retry counts | | | | | | | | Test Antenna<br>01: Antenna 1<br>02: Antenna 2 | | | | | | | |
| D20051 | 0 0 0 0 | Number of Test Bytes<br>Setting range: 0000 to 0800 (byte) | | | | | | | | | | | | | | | |
| D20052 to D20079 | 0 0 0 0 | Not used | | | | | | | | | | | | | | | |
| D20080 | 0 0 0 0 | Not used | | | | | | | | | | | | Run/Test Switching Method<br>1: CPU Unit<br>0: Test switch | | | |
| D20081 | 0 0 0 0 | Not used | | | | | | | | | | | | RF Tag Memory Setting<br>1: CA1D Mode<br>0: Standard Mode | | | |
| D20082 to D20089 | 0 0 0 0 | Not used | | | | | | | | | | | | | | | |
| D20090 | 0 0 0 0 | Not used | | | | | | | | | | | | Data Transfer Setting<br>1: Use Intelligent I/O Instructions<br>0: Use cyclic transfer | | | |
| D20091 to D20099 | 0 0 0 0 | Not used | | | | | | | | | | | | | | | |

## 2. PLC Power Supply OFF and ON



Power supply OFF → ON
(or turn ON the Unit Restart Bit)

## ■ Ladder Programming

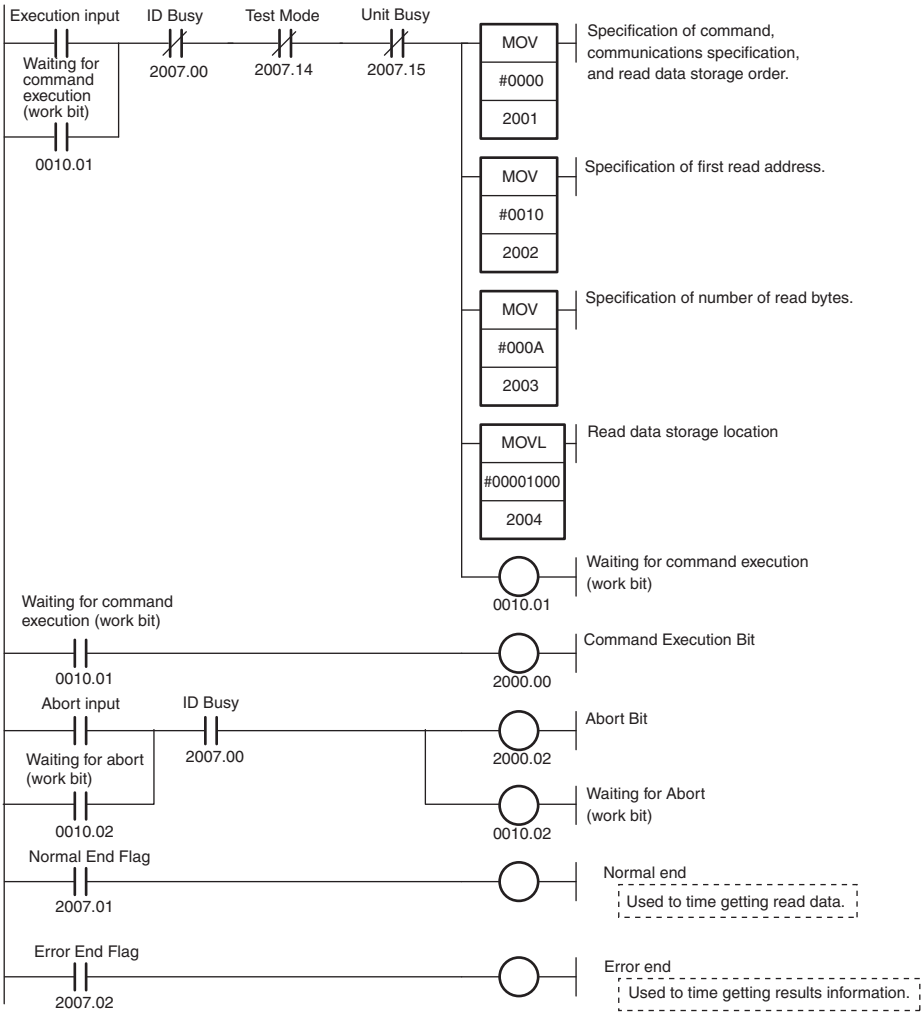



Set the Command, Communications Specification, Read Data Storage Order, First RF Tag Read Address, Number of Bytes to Read, and Read Data Storage Destination in CIO n+1 to CIO n+6 allocated in the Special I/O Unit Area (here, CIO 2011 to CIO 2016).

First word allocated to Unit in CIO Area: CIO 2000 + 10 × 0 = CIO 2000

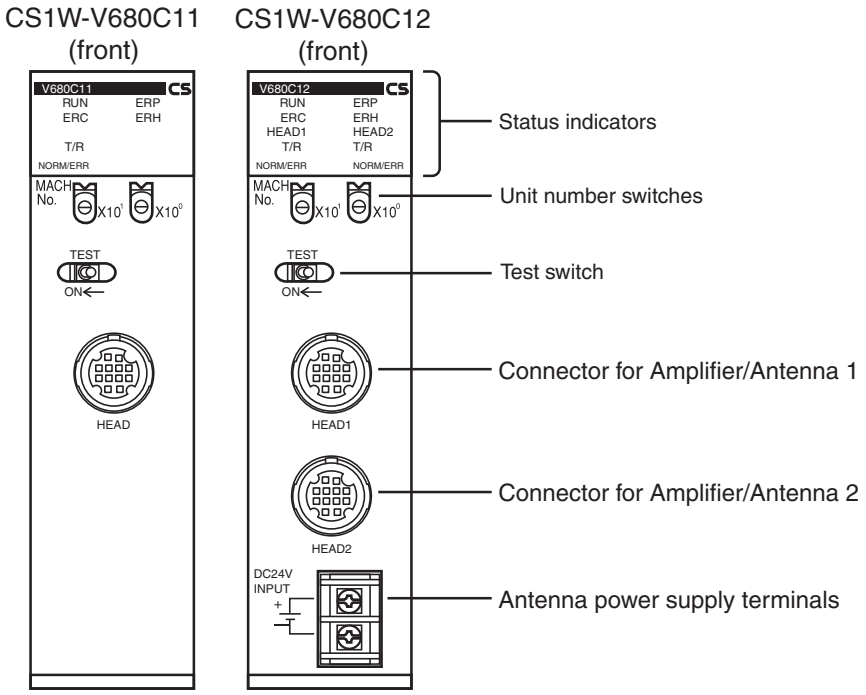
| Word address | Contents | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 00 0 0 | Command | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 10 | First read address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 0A | Number of read bytes | | | | | | | | | | | | | | | |
| CIO 2004 | 10 00 | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 0 00 | Data storage area | | | | Bank specification* | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2006 | 00 00 | --- | | | | | | | | | | | | | | | |

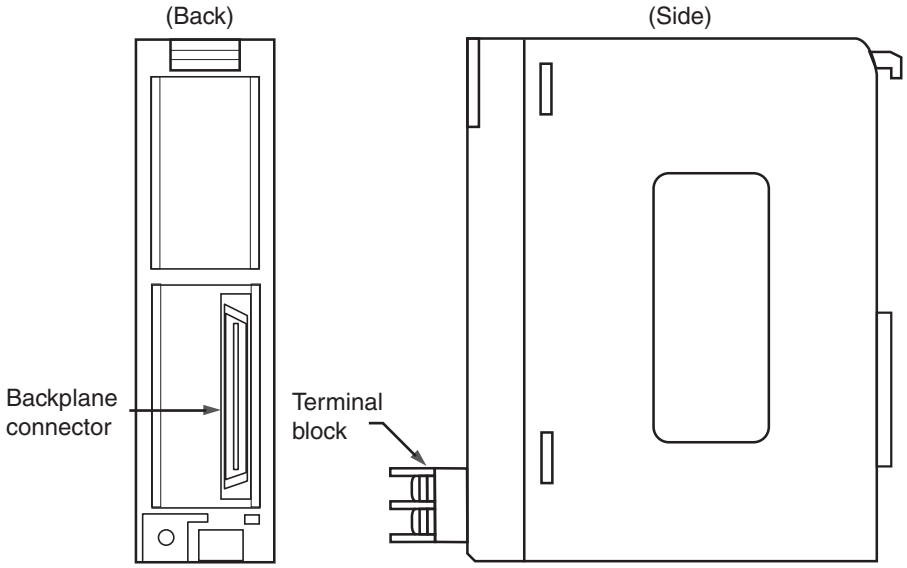
*: Always 0 when DM Area is specified. ---: Ignored.



# Part Names and Functions

## Part Names



## Indicators

Indicators show the operating status of the Units.
The relationship between the indicator status and the Units status is shown in the following table.

| Indicator | | Name | Color | Meaning | |
|---|---|---|---|---|---|
| RUN | | RUN | Green | ❍ Lit | The ID Sensor Unit is operating normally. |
| | | | | ● Not lit | The ID Sensor Unit is stopped. |
| ERC (Error in Controller) | | Unit error | Red | ❍ Lit | An error has occurred in the ID Sensor Unit. |
| | | | | ● Not lit | No error has occurred in the ID Sensor Unit. |
| ERH (Error at CPU Unit) | | CPU Unit error | Red | ❍ Lit | An error has occurred in the CPU Unit. |
| | | | | ● Not lit | No error has occurred in the CPU Unit. |
| ERP (Antenna Power Error) | | Antenna power error | Red | ❍ Lit | An error has occurred in the power supply to the Antenna. |
| | | | | ● Not lit | The power supply to the Antenna is normal. |
| HEAD1 (Antenna 1) | T/R | Communicating | Yellow | ❍ Lit | Communications are active. |
| | | | | ● Not lit | Communications not being performed with the RF Tag. |
| | NORM/ERR | Normal end | Green | ❍ Lit | Communications with the RF Tag ended normally. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| | | Error end | Red | ❍ Lit | Communications with the RF Tag ended in an error. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| HEAD2 (Antenna 2) | T/R | Communicating | Yellow | ❍ Lit | Communications are active. |
| | | | | ● Not lit | Communications not being performed with the RF Tag. |
| | NORM/ERR | Normal end | Green | ❍ Lit | Communications with the RF Tag ended normally. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| | | Error end | Red | ❍ Lit | Communications with the RF Tag ended in an error. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |

## Unit Number Switches

Data exchange between the CPU Unit and ID Sensor Unit is performed using words allocated to the Unit in the Special I/O Unit Area and in Special I/O Unit words the DM Area. The words allocated to the ID Sensor Unit in these two areas are determined by the setting of the unit number switches on the Unit's front panel.

| | | CS1W-V680C11 | | CS1W-V680C12 | |
|---|---|---|---|---|---|
| Switch No. | Unit No. | Words allocated in Special I/O Unit Area | Words allocated in DM Area | Words allocated in Special I/O Unit Area | Words allocated in DM Area |
| 0 | Unit 0 | CIO 2000 to CIO 2009 | D20000 to D20099 | CIO 2000 to CIO 2019 | D20000 to D20199 |
| 1 | Unit 1 | CIO 2010 to CIO 2019 | D20100 to D20199 | CIO 2010 to CIO 2029 | D20100 to D20299 |
| : | : | : | : | : | : |
| 94 | Unit 94 | CIO 2940 to CIO 2949 | D29400 to D29499 | CIO 2940 to CIO 2959 | D29400 to D29599 |
| 95 | Unit 95 | CIO 2950 to CIO 2959 | D29500 to D29599 | (Cannot be set) | |

## Test Switch

The test switch on the Unit's front panel is used to switch between RUN Mode and Test Mode. Specify using the test switch in the Run/Test Switching Method Setting in the DM Area to enable using this switch.

| Status | Description |
|---|---|
| OFF | RUN mode (factory setting) |
| ON | Test Mode |

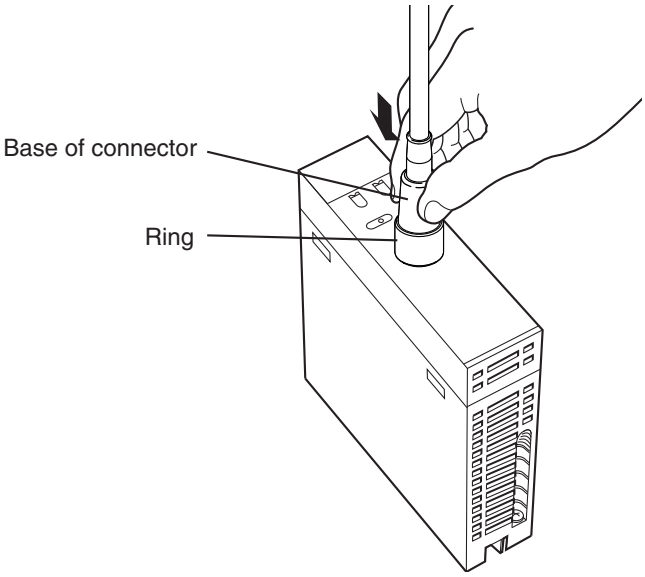
# Connections and Wiring

## Connecting the Amplifier or Antenna

### ■ Connection Method

**1.** Holding the base of the connector, align the white mark on the Unit with the white mark on the connector and insert the connector.

**2.** Press in on the connector until it locks in place.

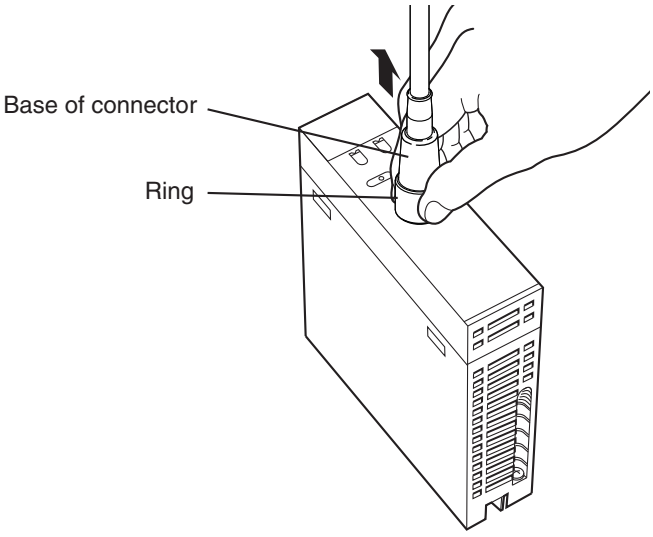



CHECK! • The connector will not lock into place if you hold onto the ring. Always hold onto the base of the connector.

CHECK! The antenna that can be connected with the connector for Amplifier/Antenna is only V680-H01.

### ■ Removal Method

**1.** Hold onto the ring and pull straight out.

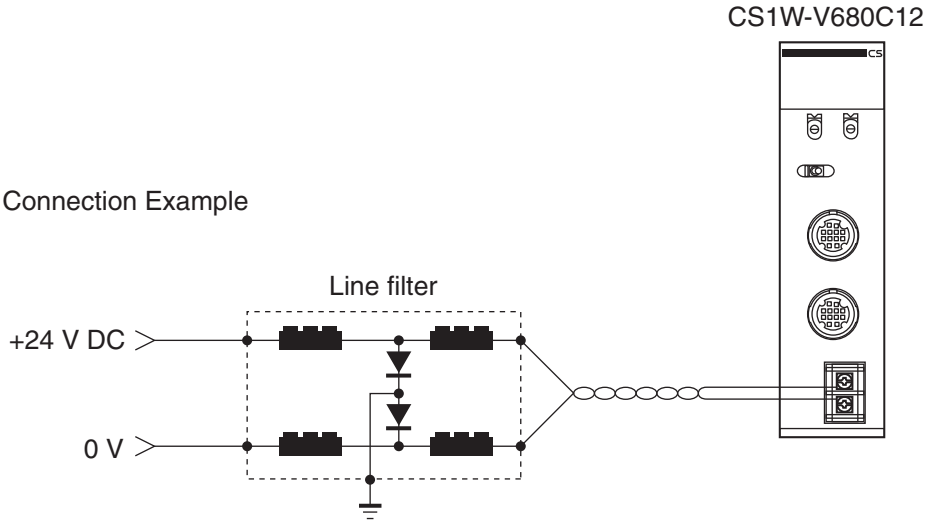



CHECK! The connector cannot be removed if you hold onto the base of the connector. Never pull on the cable with excessive force. The connectors may be broken or damaged.

CHECK! Connecting or disconnecting the connector with power to the Unit turned ON may cause the Unit to be damaged or malfunction.

## Wiring the External Power Supply (CS1W-V680C12 Only)

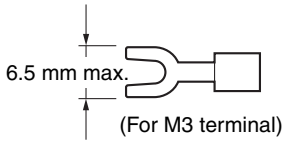
Wire the power supply as shown below.




M3 self-lifting screws are used as the connection terminals for the power supply. When necessary, use the following crimp terminals. The tightening torque is approximately 0.58 N·m.

### ■ Examples of Applicable Crimp Connectors

| Manufacturer | Model number | Applicable wire size | Shape |
|---|---|---|---|
| J.S.T Mfg. Co., Ltd. | 1.25-N3A | AWG26 to 18 | Forked |
| J.S.T Mfg. Co., Ltd. | 1.25-Y3A | | |




### ■ Recommended DC Power Supplies (Compact, DIN Track-mountable, manufactured by OMRON)

| Model number | Output capacity | Input voltage |
|---|---|---|
| S8VS-03024 | 24 VDC, 1.3 A | 100 to 240 VAC |

CHECK!
- Although adequate measures have been taken inside the ID Sensor Unit for noise entering on the power supply line, supplying power through a line filter can be used to greatly attenuate ground noise.

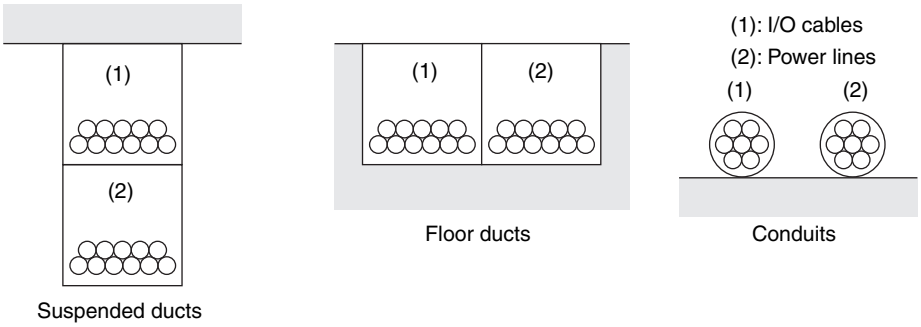
CHECK!
- Although the rated power consumption of the CS1W-V680C12 is 360 mA at 24 VDC, be sure to consider the surge current when determining capacities.

CHECK!
- When using the CS1W-V680C12, turn ON the power supply for external inputs at the same time or after the CPU Unit power supply is turned ON.

# Wiring for Safety and Noise Immunity

Antenna Cable and I/O Signal Lines

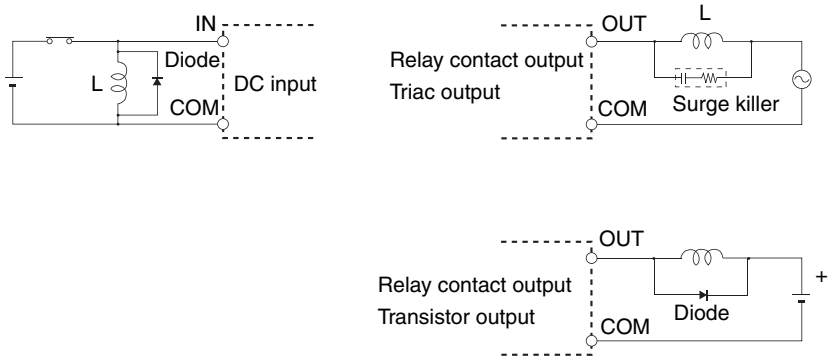
Wire the Antenna cable and I/O signal lines in separate ducts from power circuit cables both inside and outside the control panel.




If the same ducts must be used, shielded cables can be used to increase resistance to noise. If a shielded cable is used, connect one end of the shield to ground.

## • Countermeasures for Inductive Loads

If I/O is connected to an inductive load, connect a surge killer or diode in parallel with the load.




CHECK!

• Use surge killers and diodes that meet the following conditions:

Surge killer

Resistance: 50 Ω
Capacitance: 0.47 μF
Voltage: 200 V

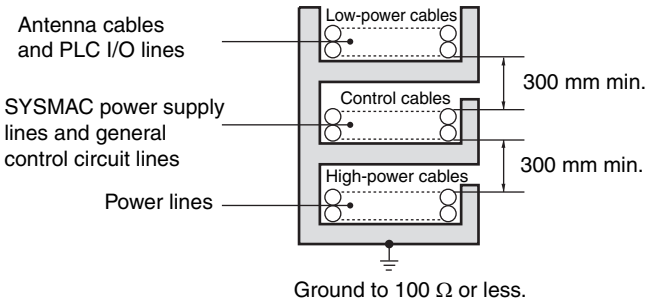
Diode

Inrush withstand voltage: 3 times load voltage min.
Average rectified current: 1 A

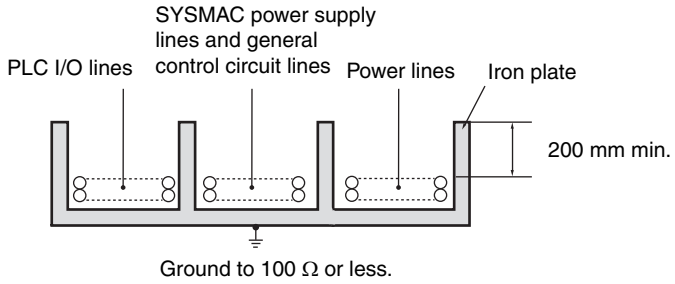
## • Noise Countermeasures for External Wiring

Consider the following items when wiring external lines, such as Antenna cable, I/O lines, power supply lines, and high-power lines.

- When using multiconductor cables for signal lines, do not use the same cable for both I/O lines and other control lines.
- When Racks are installed in parallel with each other, keep them separated by at least 300 mm.




- When placing cables in the same duct, separate them with grounded iron plates.



# SECTION 3
# CJ-series ID Sensor Units


| | |
|---|---|
| Specifications | 46 |
| Operating Procedure | 48 |
| Part Names and Functions | 54 |
| Connections and Wiring | 57 |

# Specifications

## General Specifications

General specifications conform to those of SYSMAC CJ-series Special I/O Units.

## Performance Specifications

| | CJ1W-V680C11 | | | CJ1W-V680C12 |
|---|---|---|---|---|
| Unit classification | Special I/O Unit | | | |
| Influence on CPU Unit's cycle time | 0.15 ms | | | 0.3 ms |
| Internal current consumption | V680-HA63□ Amplifier connected: 5 VDC, 260 mA<br>24 VDC, 130 mA<br>V680-H01 Antenna connected: 5 VDC, 260 mA<br>24 VDC, 280 mA | | | 5 VDC, 320 mA max.<br>24 VDC, 260 mA max. |
| Dimensions | 31 x 90 x 65 mm (W x H x D) | | | |
| Weight | 120 g max. | | | 130 g max. |
| Mounting location | CJ-series Rack or CJ-series Expansion Rack<br>(Cannot be mounted to C200H Expansion I/O Racks or SYSMAC BUS Slave Racks.) | | | |
| No. of Units per Rack | CJ1W-PA205R:<br>V680-HA63□ Amplifier connected: 4 per Rack<br>V680-H01Antenna connected: 2 per Rack<br>CJ1W-PA202:<br>V680-HA63□ Amplifier connected: 2 per Rack<br>V680-H01Antenna connected: 1per Rack<br>(See note 1.) | | | CJ1W-PA205R: 2<br>CJ1W-PA202: 1<br>(See note 1.) |
| Connectable Antennas (See note 2.) | V680-series Amplifiers (V680-HA63□)<br>V680-series Antennas (V680-H□□)<br>One channel | | | V680-series Amplifiers (V680-HA63□)<br>V680-series Antennas (V680-H□□)<br>One or two channels |
| Applicable RF Tags | V680-series RF Tags (V680-D□□) | | | |
| No. of allocated unit numbers | 1 | | | 2 |
| No. of allocated words | 10 words | | | 20 words |
| Control protocol | Special protocol | | | |
| Data exchange methods with CPU Unit | Special I/O Unit Area: CIO 2000 to CIO 2959 | Constant data exchange of 10 words/Unit | CPU Unit to ID Sensor Unit | Unit controls, communications processing specification, data storage area specification |
| | | | ID Sensor Unit to CPU Unit | Unit information, results information, processing results monitor |
| | Special I/O Unit words in DM Area: D20000 to D29599 | 100 words/Unit transferred when power is turned ON or when restarting the Unit | CPU Unit to ID Sensor Unit | System Settings, Auto Wait Time Setting, Write Protection Disable Setting, Antenna Connection Setting, Results Monitor Output, Test Setting, Run/Test Switching Method Setting |
| Data transfer quantity | 2,048 bytes max. (160 bytes/scan) (See note 3.) | | | 2,048 bytes max./channel (160 bytes/scan) (See note 3.) |
| Operating modes | Run Mode | | | |
| | Test Mode | • Communications tests<br>• Distance level measurements<br>• Read speed level measurements<br>• Write speed level measurements<br>• Noise level measurements<br>• Communications success rate measurements | | |
| Diagnostic functions | (1) CPU watchdog timer<br>(2) Communications error detection with RF Tag<br>(3) Antenna power supply error | | | |

**Note 1.** "Rack" indicates either the CPU Rack or an Expansion Rack.

**2.** The V680-H01 Antenna can be connected only to the CJ1W-V680C11 ID Sensor Unit. It cannot be used with the CJ1W-V680C12 ID Sensor Unit.

**3.** If using Intelligent I/O Instructions is specified as the data transfer method, up to 2,048 bytes can be transferred in one scan.

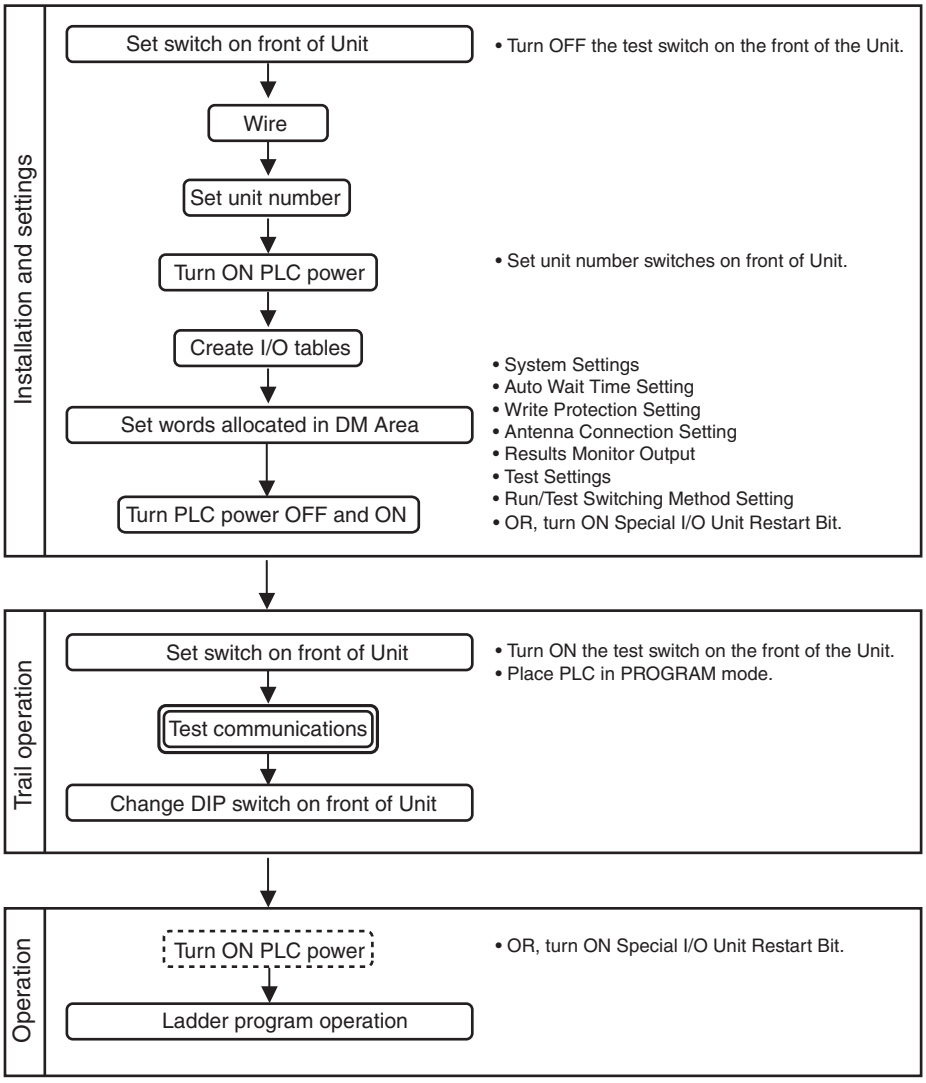
# Communications Function Specifications

| | CJ1W-V680C11 | CJ1W-V680C12 |
|---|---|---|
| Communications control | (1) RF Tag Communications Speed (Normal Mode or High-speed Mode)<br>(2) Write Verification<br>(3) Auto Wait Time Setting<br>(4) UID Addition Setting<br>(5) Write Protection Disable Setting<br>(6) Antenna Connection Setting (One-channel ID Sensor Unit (CJ1W-V680C11))<br>(7) Results Monitor Output Setting | |
| Commands | Read<br>Write<br>Bit Set/Bit Clear<br>Mask Bit Write<br>Calculation Write<br>Data Fill<br>Data Check<br>Number of Writes Control<br>Read with Error Correction<br>Write with Error Correction<br>UID Read<br>Noise Measurement | Read<br>Write<br>Bit Set/Bit Clear<br>Mask Bit Write<br>Calculation Write<br>Data Fill<br>Data Check<br>Number of Writes Control<br>Copy<br>Read with Error Correction<br>Write with Error Correction<br>UID Read<br>Noise Measurement |
| Communications specification | Single trigger<br>Single auto<br>Repeat auto<br>FIFO trigger (See note)<br>FIFO repeat (See note)<br>Multi-access trigger (See note)<br>Multi-access repeat (See note) | |

**Note:** FIFO trigger, FIFO repeat, Multi-access trigger, and Multi-access repeat specification cannot be used for communicating with V680-D1KP□□ RF Tags.

# Operating Procedure

The operating procedure for an ID Sensor Unit is shown in the following flowchart.


Installation and settings
Set switch on front of Unit
• Turn OFF the test switch on the front of the Unit.
Wire
Set unit number
Turn ON PLC power
• Set unit number switches on front of Unit.
Create I/O tables
Set words allocated in DM Area
• System Settings
• Auto Wait Time Setting
• Write Protection Setting
• Antenna Connection Setting
• Results Monitor Output
• Test Settings
• Run/Test Switching Method Setting
• OR, turn ON Special I/O Unit Restart Bit.
Turn PLC power OFF and ON
Trail operation
Set switch on front of Unit
• Turn ON the test switch on the front of the Unit.
• Place PLC in PROGRAM mode.
Test communications
Change DIP switch on front of Unit
Operation
Turn ON PLC power
• OR, turn ON Special I/O Unit Restart Bit.
Ladder program operation

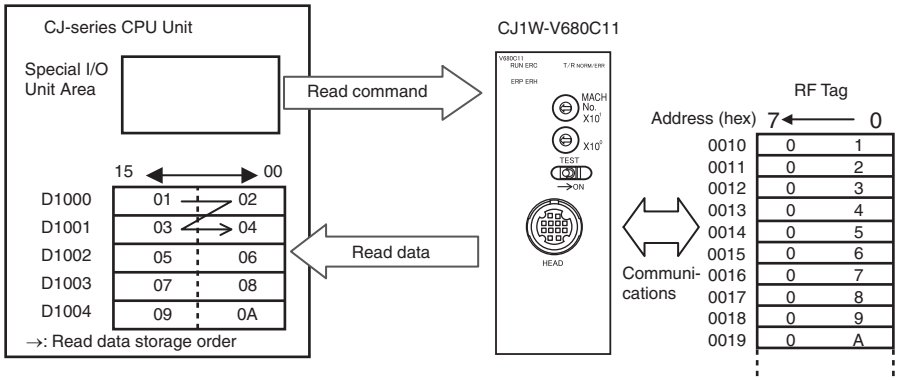
CHECK!

- When using CX-Programmer V3.0 or later with the CJ1W-V680C12, "I" will be displayed before addresses for inputs in the ladder diagram and "Q" will be displayed before addresses for outputs for operation data. In the CX-Programmer's I/O Table Window, select SIOU/C200H ASCII Unit (A) and then, from the Enter SIOU Details Window, set the Address per Unit to 2, the Input Words to 3, and the Output Words to 7, and select the Repeat IN/OUT for each Address per Unit option.
- When using CX-Programmer V2.0 or later with the CJ1W-V680C11, "I" will be displayed in the ladder diagram before address for inputs and "Q" will be displayed before addresses for outputs for operation data.

# Operating Procedure Example

The following is an operating procedure example for the following conditions.

Reading 10 Bytes of Data from RF Tag Address 0010 Using a Trigger.




## • Special I/O Unit Area Settings

Unit number: 00

Command: Read

Communications specification: Trigger

Read data storage order: Leftmost → Rightmost

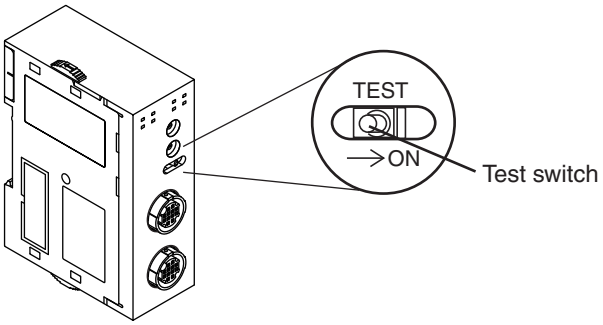
First RF Tag read address: 0010 hex

Number of RF Tag read bytes: 10 bytes

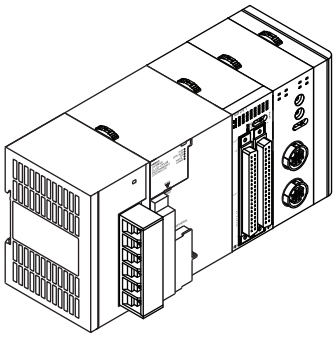
Read data storage destination: D1000 to D1004

## ■ ID Sensor Unit Settings

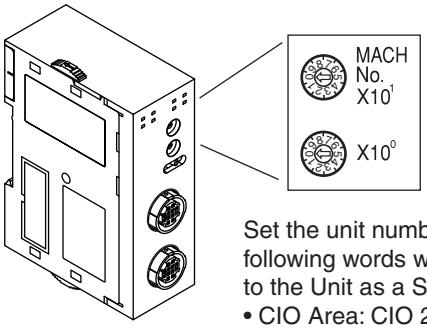
**1.** Test Switch (Set on Unit's front panel.)




**2.** Mounting and Installation

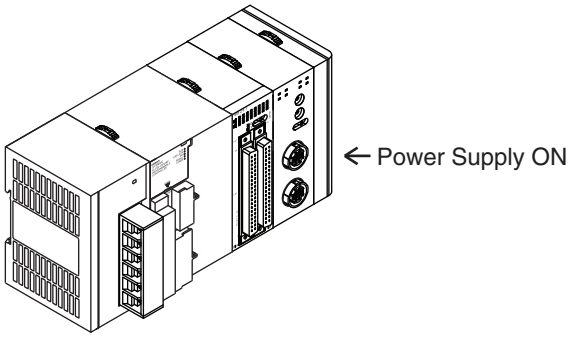


**3.** Unit Number Setting



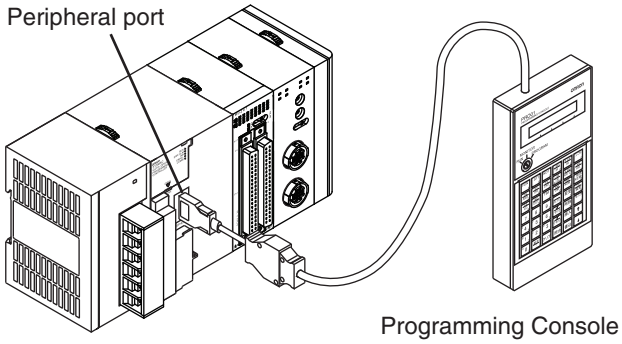

Set the unit number to 1, and the following words will be allocated to the Unit as a Special I/O Unit.
- CIO Area: CIO 2010 to CIO 2019
- DM Area: D20100 to D20199

**4.** PLC Power Supply ON



## ■ Creating I/O Tables

Always create the I/O tables after turning ON the PLC power supply. The I/O tables can be created from the Programming Console or CX-Programmer.



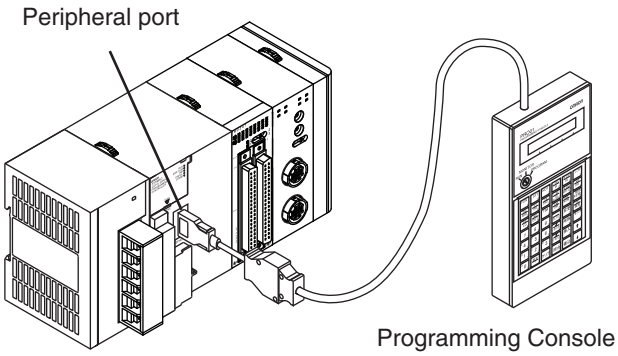

## ■ Initial Settings

**1.** Make the settings in the words allocated to Special I/O Units in the DM Area.

CHECK!

For information on setting the Special I/O Unit words in the DM Area, refer to *Parameter Settings in DM Area* on page 93.

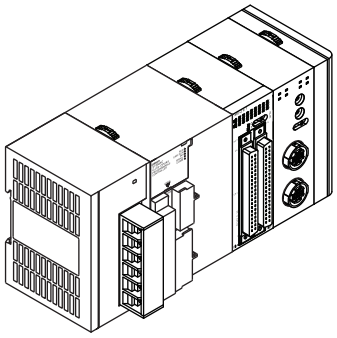
p. 93



First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

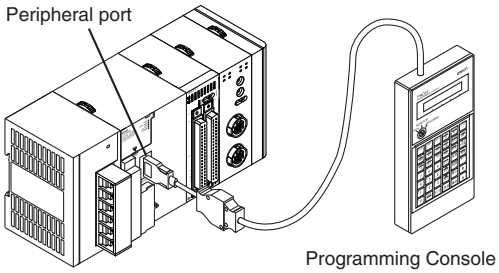
| DM address | Contents | Meaning |
|---|---|---|
| D20000 | 0 0 0 0 | UID Addition<br>0: Disabled<br>1: Enabled<br>Test Mode Disable<br>0: Enabled<br>1: Disabled<br>Write Verification<br>0: Verification<br>1: No verification<br>Communications Speed<br>0: Normal<br>1: High-speed |
| D20001 | 0 0 0 0 | Auto Wait Time<br>Setting range: 0000 to 9999 (×0.1 s)<br>Factory setting: 0000 (infinite) |
| D20002 | 0 0 0 0 | Not used<br>Not used<br>Write Protection Disable<br>00: V680 method<br>01: Disabled<br>10: V600 method |
| D20003 | 0 0 0 0 | Not used<br>Not used<br>Not used<br>Antenna Connection<br>0: Standard Antenna<br>1: V680-H01 |
| D20004 | 0 0 0 0 | Not used<br>Not used<br>Not used<br>Results Monitor Output<br>0: Communications time<br>1: Noise level |
| D20005 to D20049 | 0 0 0 0 | Not used |
| D20050 | 0 0 0 0 | Test Operation<br>00: Communications test<br>A0: Distance level<br>B0: Read speed level<br>B1: Write speed level<br>C0: Noise level<br>C1: Communications success rate<br>C2: Retry counts<br>Test Antenna<br>01: Antenna 1<br>02: Antenna 2 |
| D20051 | 0 0 0 0 | Number of Test Bytes<br>Setting range: 0000 to 0800 (byte) |
| D20052 to D20079 | 0 0 0 0 | Not used |
| D20080 | 0 0 0 0 | Not used<br>Run/Test Switching Method<br>1: CPU Unit<br>0: Test switch |
| D20081 | 0 0 0 0 | Not used<br>RF Tag Memory Setting<br>1: CA1D Mode<br>0: Standard Mode |
| D20082 to D20089 | 0 0 0 0 | Not used |
| D20090 | 0 0 0 0 | Not used<br>Data Transfer Setting<br>1: Use Intelligent I/O Instructions<br>0: Use cyclic transfer |
| D20091 to D20099 | 0 0 0 0 | Not used |

## 2. PLC Power Supply OFF and ON



Power supply OFF → ON
(or turn ON the Unit Restart Bit)

## ■ Ladder Programming

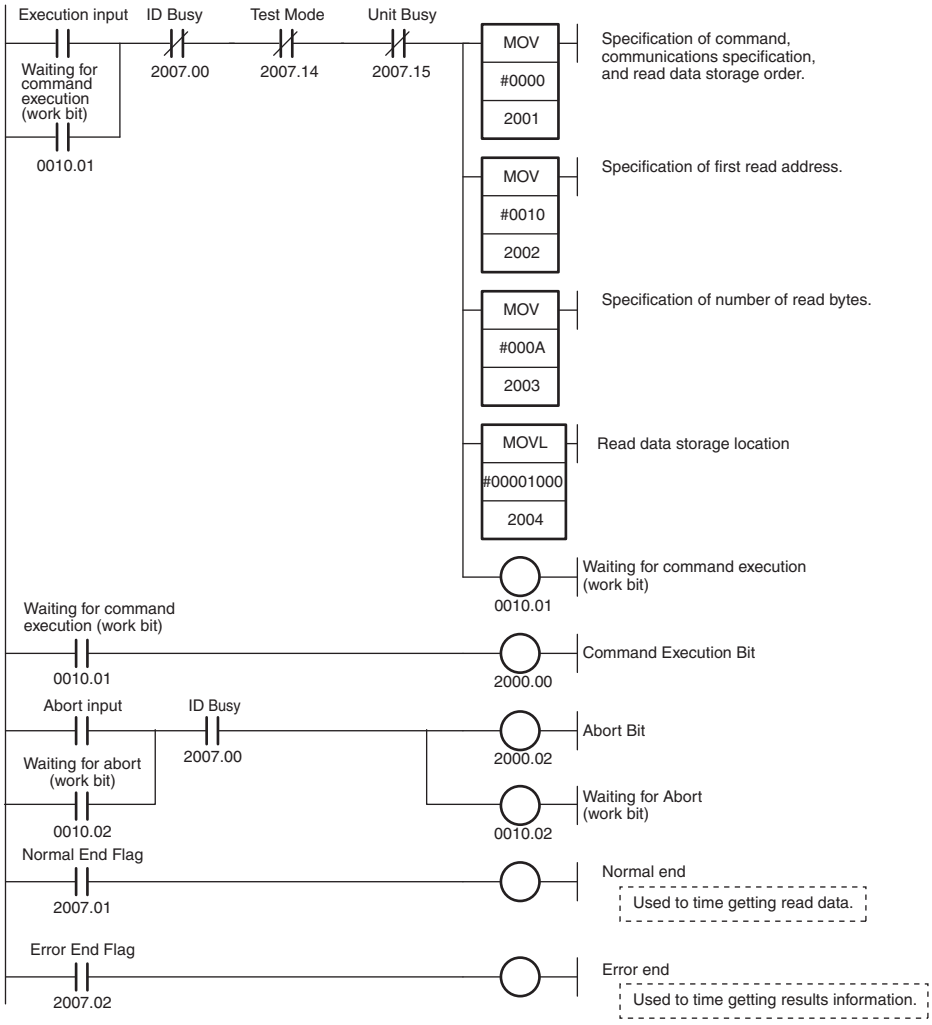



Set the Command, Communications Specification, Read Data Storage Order, First RF Tag Read Address, Number of Bytes to Read, and Read Data Storage Destination in CIO n+1 to CIO n+6 allocated in the Special I/O Unit Area (here, CIO 2001 to CIO 2006).

First word allocated to Unit in CIO Area: CIO 2000 + 10 × 0 = CIO 2000

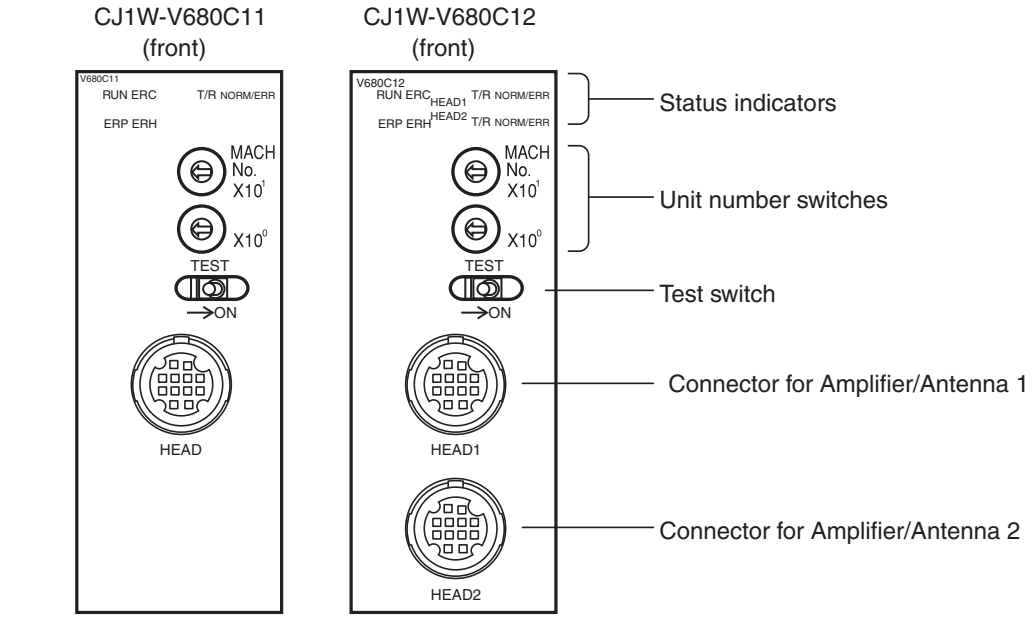
| Word address | Contents | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 00 0 0 | Command | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 10 | First read address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 0A | Number of read bytes | | | | | | | | | | | | | | | |
| CIO 2004 | 10 00 | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 0 00 | Data storage area | | | | Bank specification* | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2006 | 00 00 | --- | | | | | | | | | | | | | | | |

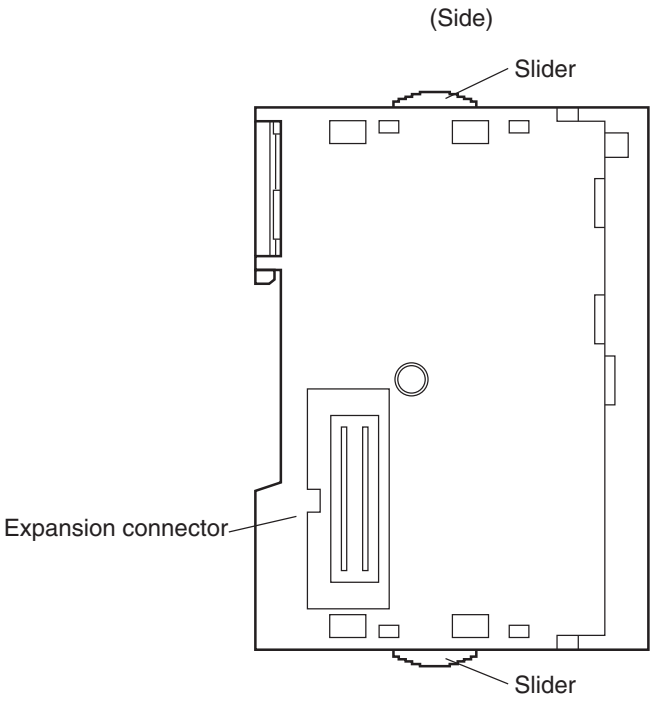
*: Always 0 when DM Area is specified. ---: Ignored.



# Part Names and Functions

## Part Names



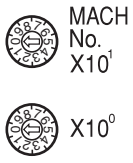
## Indicators

The indicators show the operating status of the Unit. The relationship between the indicator status and the Unit status is shown in the following table.

| Indicator | | Name | Color | Meaning | |
|---|---|---|---|---|---|
| RUN | | RUN | Green | ❍ Lit | The ID Sensor Unit is operating normally. |
| | | | | ● Not lit | The ID Sensor Unit is stopped. |
| ERC (Error in Controller) | | Unit error | Red | ❍ Lit | An error has occurred in the ID Sensor Unit. |
| | | | | ● Not lit | No error has occurred in the ID Sensor Unit. |
| ERH (Error at CPU Unit) | | CPU Unit error | Red | ❍ Lit | An error has occurred in the CPU Unit. |
| | | | | ● Not lit | No error has occurred in the CPU Unit. |
| ERP (Antenna Power Error) | | Antenna power error | Red | ❍ Lit | An error has occurred in the power supply to the Antenna. |
| | | | | ● Not lit | The power supply to the Antenna is normal. |
| HEAD1 (Antenna 1) | T/R | Communicating | Yellow | ❍ Lit | Communications are active. |
| | | | | ● Not lit | Communications not being performed with the RF Tag. |
| | NORM/ERR | Normal end | Green | ❍ Lit | Communications with the RF Tag ended normally. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| | | Error end | Red | ❍ Lit | Communications with the RF Tag ended in an error. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| HEAD2 (Antenna 2) | T/R | Communicating | Yellow | ❍ Lit | Communications are active. |
| | | | | ● Not lit | Communications not being performed with the RF Tag. |
| | NORM/ERR | Normal end | Green | ❍ Lit | Communications with the RF Tag ended normally. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| | | Error end | Red | ❍ Lit | Communications with the RF Tag ended in an error. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |

## Unit Number Switches

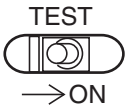
Data exchange between the CPU Unit and ID Sensor Unit is performed using words allocated to the Unit in the Special I/O Unit Area and in the Special I/O Unit words in the DM Area. The words allocated to the ID Sensor Unit in these two areas are determined by the setting of the unit number switches on the Unit's front panel.




| | | CJ1W-V680C11 | | CJ1W-V680C12 | |
|---|---|---|---|---|---|
| **Switch No.** | **Unit No.** | **Words allocated in Special I/O Unit Area** | **Words allocated in DM Area** | **Words allocated in Special I/O Unit Area** | **Words allocated in DM Area** |
| 0 | Unit 0 | CIO 2000 to CIO 2009 | D20000 to D20099 | CIO 2000 to CIO 2019 | D20000 to D20199 |
| 1 | Unit 1 | CIO 2010 to CIO 2019 | D20100 to D20199 | CIO 2010 to CIO 2029 | D20100 to D20299 |
| : | : | : | : | : | : |
| 94 | Unit 94 | CIO 2940 to CIO 2949 | D29400 to D29499 | CIO 2940 to CIO 2959 | D29400 to D29599 |
| 95 | Unit 95 | CIO 2950 to CIO 2959 | D29500 to D29599 | (Cannot be set) | |

## Test Switch

The test switch on the Unit's front panel is used to switch between Run Mode and Test Mode. Specify using the test switch in the Run/Test Switching Method Setting in the DM Area to enable using this switch.




| Status | Description |
|---|---|
| OFF | Run Mode (factory setting) |
| ON | Test Mode |

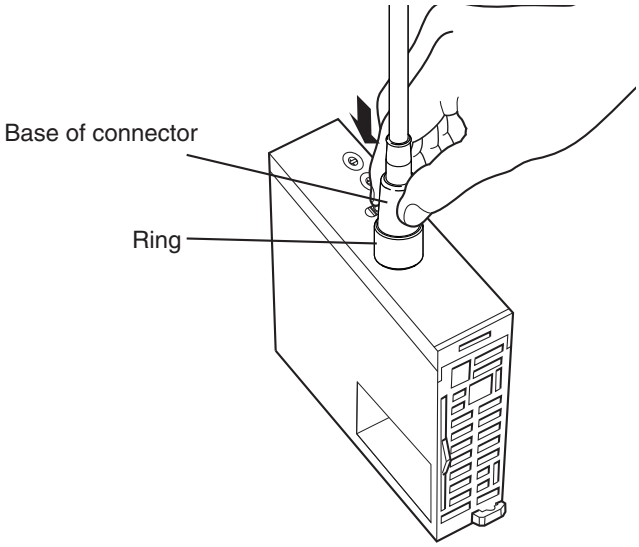
# Connections and Wiring

## Connecting the Antenna

### ■ Connection Method

**1.** Holding the base of the connector, align the white mark on the Unit with the white mark on the connector and insert the connector.

**2.** Press in on the connector until it locks in place.

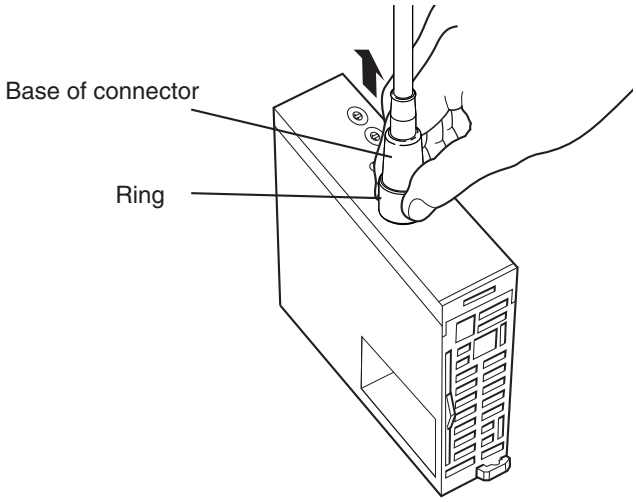



CHECK! The connector will not lock into place if you hold onto the ring. Always hold onto the base of the connector.

CHECK! The antenna that can be connected with the connector for Amplifier/Antenna is only V680-H01.

### ■ Removal Method

**1.** Hold onto the ring and pull straight out.



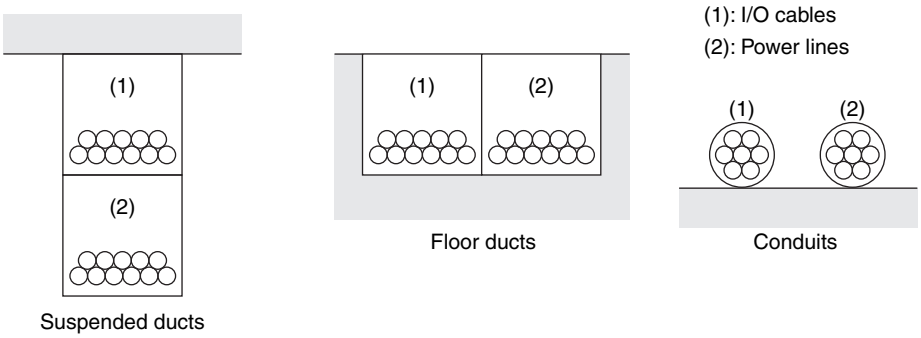

CHECK! The connector cannot be removed if you hold onto the base of the connector. Never pull on the cable with excessive force. The connectors may be broken or damaged.

CHECK! Connecting or disconnecting the connector with power to the Unit turned ON may cause the Unit to be damaged or malfunction.

# Wiring for Safety and Noise Immunity

Antenna Cable and I/O Signal Lines

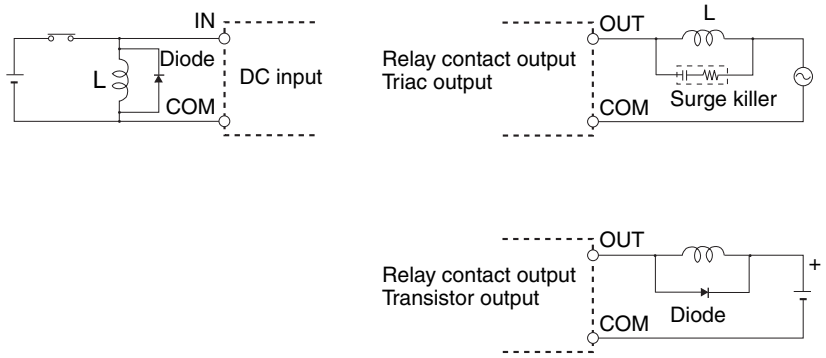
Wire the Antenna cable and I/O signal lines in separate ducts from power circuit cables both inside and outside the control panel.




If the same ducts must be used, shielded cables can be used to increase resistance to noise. If a shielded cable is used, connect one end of the shield to ground.

## • Countermeasures for Inductive Loads

If I/O is connected to an inductive load, connect a surge killer or diode in parallel with the load.




CHECK!

Use surge killers and diodes that meet the following conditions:

Surge Killers

Resistance: 50 Ω
Capacitance: 0.47 μF
Voltage: 200 V

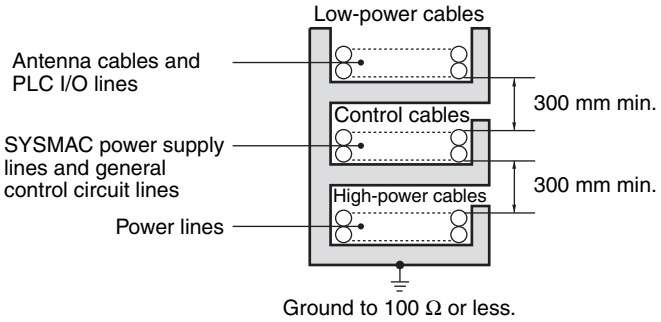
Diodes

Inrush withstand voltage: 3 times load voltage min.
Average rectified current: 1 A

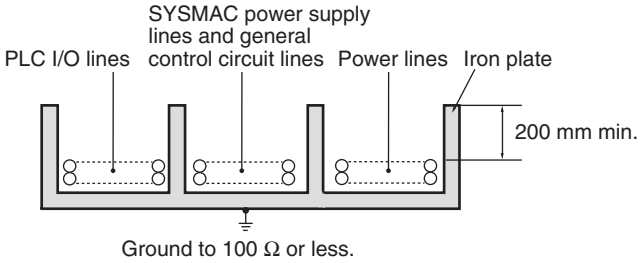
## • Noise Countermeasures for External Wiring

Consider the following items when wiring external lines, such as the Antenna cable, I/O lines, power supply lines, and high-power lines.

- When using multiconductor cables for signal lines, do not use the same cable for both I/O lines and other control lines.
- When Racks are installed in parallel with each other, keep them separated by at least 300 mm.




- When placing cables in the same duct, separate them with grounded iron plates.



MEMO

# SECTION 4
# Data Exchange with the CPU Unit


| | |
|---|---|
| Outline of Data Exchange | 62 |
| Initial Settings Data | 65 |
| I/O Data Allocations | 67 |

# Outline of Data Exchange

Data is exchanged between the CS/CJ-series CPU Unit and CS1W-V680C11/C12 or CJ1W-V680C11/C12 ID Sensor Unit through I/O words allocated in the Special I/O Unit Area and initial setting words allocated in the DM Area.

- **I/O Data**

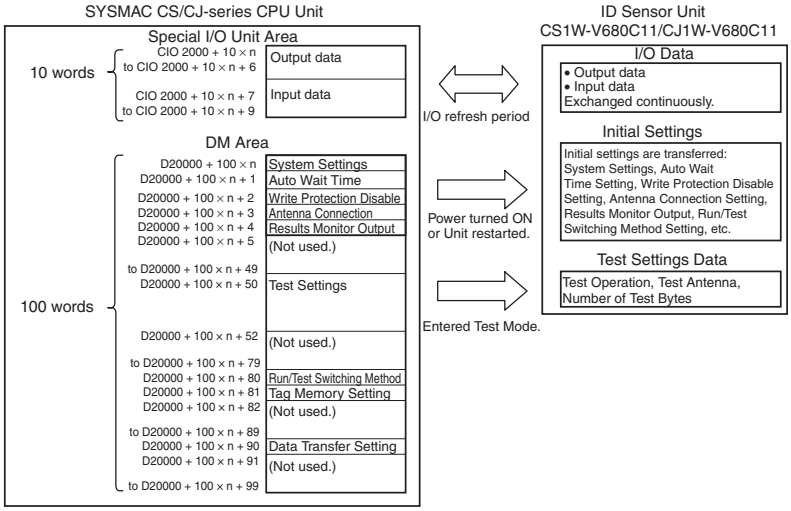
  Words are allocated in the Special I/O Unit Area of the CPU Unit for ID Sensor Unit I/O data, including Unit Controls, commands, results information, etc., according to the unit number. This data is exchanged continuously during the I/O refresh period.

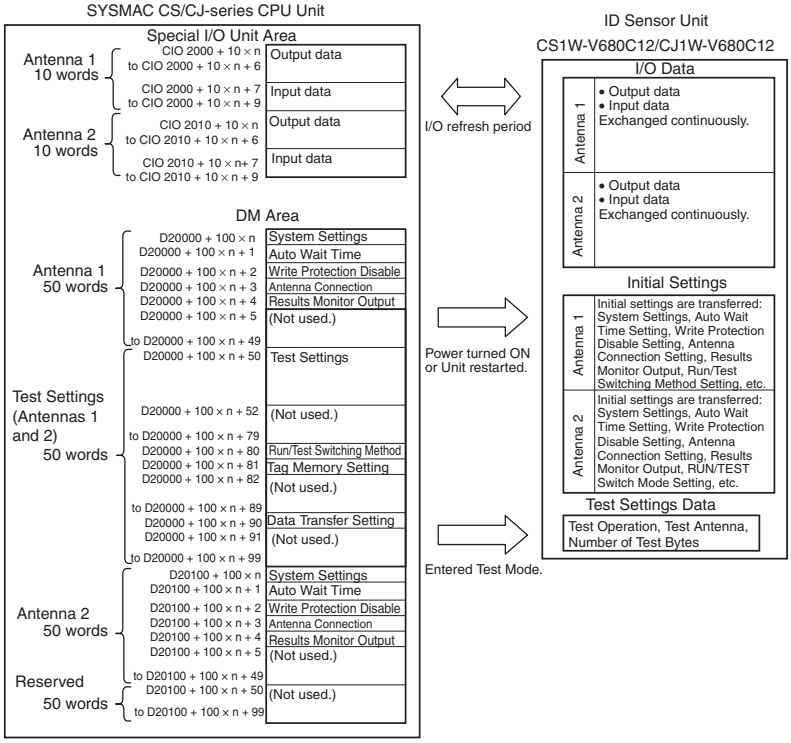
- **Initial Settings Data**

  Words are allocated to the ID Sensor Unit in the DM Area of the CPU Unit for ID Sensor Unit initial settings, including the System Settings and Auto Wait Time Settings, Test Settings, etc., according to the unit number. This data is transferred when the power supply is turned ON or when restarting the Unit.

- **Test Settings Data**

  Words are allocated to the ID Sensor Unit in the DM Area of the CPU Unit for test settings, including the Test Operation, Test Antenna, and Number of Test Bytes according to the unit number. This data is transferred when the power supply is turned ON.

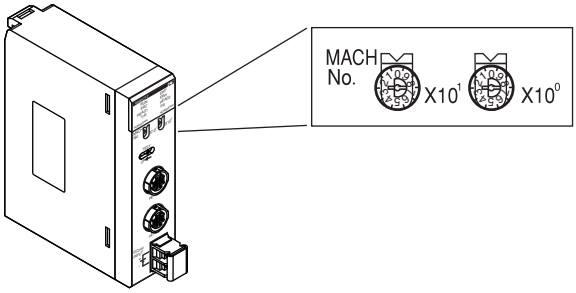

SYSMAC CS/CJ-series CPU Unit
Special I/O Unit Area
10 words
CIO 2000 + 10 × n to CIO 2000 + 10 × n + 6
Output data
CIO 2000 + 10 × n + 7 to CIO 2000 + 10 × n + 9
Input data
DM Area
100 words
D20000 + 100 × n
System Settings
D20000 + 100 × n + 1
Auto Wait Time
D20000 + 100 × n + 2
Write Protection Disable
D20000 + 100 × n + 3
Antenna Connection
D20000 + 100 × n + 4
Results Monitor Output
D20000 + 100 × n + 5
(Not used.)
to D20000 + 100 × n + 49
D20000 + 100 × n + 50
Test Settings
D20000 + 100 × n + 52
(Not used.)
to D20000 + 100 × n + 79
D20000 + 100 × n + 80
Run/Test Switching Method
D20000 + 100 × n + 81
Tag Memory Setting
D20000 + 100 × n + 82
(Not used.)
to D20000 + 100 × n + 89
D20000 + 100 × n + 90
Data Transfer Setting
D20000 + 100 × n + 91
(Not used.)
to D20000 + 100 × n + 99
I/O refresh period
Power turned ON or Unit restarted.
Entered Test Mode.
ID Sensor Unit
CS1W-V680C11/CJ1W-V680C11
I/O Data
• Output data
• Input data
Exchanged continuously.
Initial Settings
Initial settings are transferred: System Settings, Auto Wait Time Setting, Write Protection Disable Setting, Antenna Connection Setting, Results Monitor Output, Run/Test Switching Method Setting, etc.
Test Settings Data
Test Operation, Test Antenna, Number of Test Bytes


SYSMAC CS/CJ-series CPU Unit
Special I/O Unit Area
Antenna 1 10 words
CIO 2000 + 10 × n to CIO 2000 + 10 × n + 6
Output data
CIO 2000 + 10 × n + 7 to CIO 2000 + 10 × n + 9
Input data
Antenna 2 10 words
CIO 2010 + 10 × n to CIO 2010 + 10 × n + 6
Output data
CIO 2010 + 10 × n+ 7 to CIO 2010 + 10 × n + 9
Input data
DM Area
Antenna 1 50 words
D20000 + 100 × n
System Settings
D20000 + 100 × n + 1
Auto Wait Time
D20000 + 100 × n + 2
Write Protection Disable
D20000 + 100 × n + 3
Antenna Connection
D20000 + 100 × n + 4
Results Monitor Output
D20000 + 100 × n + 5
(Not used.)
to D20000 + 100 × n + 49
Test Settings (Antennas 1 and 2) 50 words
D20000 + 100 × n + 50
Test Settings
D20000 + 100 × n + 52
(Not used.)
to D20000 + 100 × n + 79
D20000 + 100 × n + 80
Run/Test Switching Method
D20000 + 100 × n + 81
Tag Memory Setting
D20000 + 100 × n + 82
(Not used.)
to D20000 + 100 × n + 89
D20000 + 100 × n + 90
Data Transfer Setting
D20000 + 100 × n + 91
(Not used.)
to D20000 + 100 × n + 99
Antenna 2 50 words
D20100 + 100 × n
System Settings
D20100 + 100 × n + 1
Auto Wait Time
D20100 + 100 × n + 2
Write Protection Disable
D20100 + 100 × n + 3
Antenna Connection
D20100 + 100 × n + 4
Results Monitor Output
D20100 + 100 × n + 5
(Not used.)
to D20100 + 100 × n + 49
Reserved 50 words
D20100 + 100 × n + 50
(Not used.)
to D20100 + 100 × n + 99
I/O refresh period
Power turned ON or Unit restarted.
Entered Test Mode.
ID Sensor Unit
CS1W-V680C12/CJ1W-V680C12
I/O Data
Antenna 1
• Output data
• Input data
Exchanged continuously.
Antenna 2
• Output data
• Input data
Exchanged continuously.
Initial Settings
Antenna 1
Initial settings are transferred: System Settings, Auto Wait Time Setting, Write Protection Disable Setting, Antenna Connection Setting, Results Monitor Output, Run/Test Switching Method Setting, etc.
Antenna 2
Initial settings are transferred: System Settings, Auto Wait Time Setting, Write Protection Disable Setting, Antenna Connection Setting, Results Monitor Output, RUN/TEST Switch Mode Setting, etc.
Test Settings Data
Test Operation, Test Antenna, Number of Test Bytes

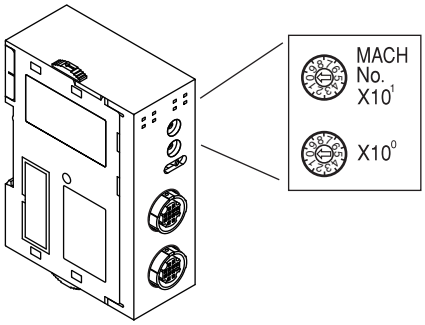
## Unit Number Setting

The words allocated to the ID Sensor Unit in the Special I/O Unit Area and in the DM Area are determined by the unit number setting on the Unit's front panel.

CS1W-V680C11/C12




CJ1W-V680C11/C12




| Switch No. | Unit No. | CS1W-V680C11/ CJ1W-V680C11 | | CS1W-V680C12/ CJ1W-V680C12 | |
|---|---|---|---|---|---|
| | | Words allocated in Special I/O Unit Area | Words allocated in DM Area | Words allocated in Special I/O Unit Area | Words allocated in DM Area |
| 0 | Unit 0 | CIO 2000 to CIO 2009 | D20000 to D20099 | CIO 2000 to CIO 2019 | D20000 to D20199 |
| 1 | Unit 1 | CIO 2010 to CIO 2019 | D20100 to D20199 | CIO 2010 to CIO 2029 | D20100 to D20299 |
| : | : | : | : | : | : |
| 94 | Unit 94 | CIO 2940 to CIO 2949 | D29400 to D29499 | CIO 2940 to CIO 2959 | D29400 to D29599 |
| 95 | Unit 95 | CIO 2950 to CIO 2959 | D29500 to D29599 | (Cannot be set) | |

CHECK!

- If the same unit number is set for more than one Special I/O Unit, a fatal error (No. duplication error on CX-Programmer or Unit Number Duplication on Programming Console), and the PLC will not operate.
- When a Two-channels ID Sensor Unit (CS1W-V680C12 or CJ1W-V680C12) is used, two unit numbers are allocated.

## Special I/O Unit Restart Bits

Unit operation can be restarted after DM Area settings have been changed or after an error has been corrected by turning the power supply to the PLC OFF and ON or by turning ON the Special I/O Unit Restart Bit.

### • CS-series Special I/O Unit Restart Bits

| Bit address | Function | |
|---|---|---|
| A50200 | Unit 0 Restart Bit | The Unit will be restarted when the corresponding bit is turned ON. After the Unit has finished restarting, the corresponding bit will be automatically turned OFF. |
| A50201 | Unit 1 Restart Bit | |
| ⋮ | ⋮ | |
| A50215 | Unit 15 Restart Bit | |
| A50300 | Unit 16 Restart Bit | |
| ⋮ | ⋮ | |
| A50715 | Unit 95 Restart Bit | |

### • CJ-series Special I/O Unit Restart Bits

| Bit address | Function | |
|---|---|---|
| A50200 | Unit 0 Restart Bit | The Unit will be restarted when the corresponding bit is turned ON. After the Unit has finished restarting, the corresponding bit will be automatically turned OFF. |
| A50201 | Unit 1 Restart Bit | |
| ⋮ | ⋮ | |
| A50215 | Unit 15 Restart Bit | |
| A50300 | Unit 16 Restart Bit | |
| ⋮ | ⋮ | |
| A50715 | Unit 95 Restart Bit | |

- Exchanged data will be all zeros while the Unit is being restarted.

CHECK!

- Replace the ID Sensor Unit if an error cannot be cleared even after turning the power supply OFF and ON or after turning ON the Special I/O Unit Restart Bit.

# Initial Settings Data

## DM Area Allocations and Contents

The initial settings for the ID Sensor Unit are performed using the words allocated to the ID Sensor Unit as a Special I/O Unit in the DM Area.

SYSMAC CS-/CJ-series PLC

Special I/O Unit Words in DM Area

| | Allocated Words |
|---|---|
| Unit 0 | D20000 to D20099 |
| Unit 1 | D20100 to D20199 |
| Unit 2 | D20200 to D20299 |
| Unit 3 | D20300 to D20399 |
| Unit 4 | D20400 to D20499 |
| Unit 5 | D20500 to D20599 |
| Unit 6 | D20600 to D20699 |
| Unit 7 | D20700 to D20799 |
| Unit 8 | D20800 to D20899 |
| Unit 9 | D20900 to D20999 |
| Unit 10 | D21000 to D21099 |
| . | . |
| Unit n | D20000 + 100 × n to D20000 + 100 × n + 99 |
| . | . |
| Unit 95 | D29500 to D29599 |

Transferred automatically according to unit number when power is turned ON or the Special I/O Unit Restart Bit is turned ON.

ID Sensor Unit
CS1W-V680C11/CJ1W-V680C11

Initial Settings

| | |
|---|---|
| m | System Settings |
| m+1 | Auto Wait Time |
| m+2 | Write Protection Disable |
| m+3 | Antenna Connection |
| m+4 | Results Monitor Output |
| to | (Not used) |
| m+50 | Test Settings |
| m+51 | Test Settings |
| to | (Not used) |
| m+80 | Run/Test Switching Method |
| m+81 | Tag Memory Setting |
| to | (Not used) |
| m+90 | Data Transfer Setting |
| to | (Not used) |

(m = D20000 + 100 × Unit No.)

SYSMAC CS-/CJ-series PLC

Special I/O Unit Words in DM Area

| | Allocated Words | | |
|---|---|---|---|
| Unit 0 | D20000 to D20199 | D20100 to D20299 | Unit 1 |
| Unit 2 | D20200 to D20399 | D20300 to D20499 | Unit 3 |
| Unit 4 | D20400 to D20599 | D20500 to D20699 | Unit 5 |
| Unit 6 | D20600 to D20799 | D20700 to D20899 | Unit 7 |
| Unit 8 | D20800 to D20999 | D20900 to D21099 | Unit 9 |
| Unit 10 | D21000 to D21199 | | |
| | | | |
| Unit n | D20000 + 100 × n to D20100 + 100 × n + 99 | | |
| . | . | | |
| Unit 94 | D29400 to D29599 | | |

Transferred automatically according to unit number when power is turned ON or the Special I/O Unit Restart Bit is turned ON.

ID Sensor Unit
CS1W-V600C12/CJ1W-V600C12

Initial Settings

| | |
|---|---|
| m | System Settings |
| m+1 | Auto Wait Time |
| m+2 | Write Protection Disable |
| m+3 | Antenna Connection |
| m+4 | Results Monitor Output |
| to | (Not used) |
| m+50 | Test Settings |
| m+51 | Test Settings |
| to | (Not used) |
| m+80 | Run/Test Switching Method |
| m+81 | Tag Memory Setting |
| to | (Not used) |
| m+90 | Data Transfer Setting |
| to | (Not used) |
| m+100 | System Settings |
| m+101 | Auto Wait Time |
| m+102 | Write Protection Disable |
| m+103 | Antenna Connection |
| m+104 | Results Monitor Output |
| to | (Not used) |

(m = D20000 +100 × Unit No.)

CHECK!

- The words allocated to the ID Sensor Unit as a Special I/O Unit in the DM Area are determined by the setting of the unit number switches on the Unit's front panel. Set unit numbers so that the same words are not allocated to more than one Unit. (Refer to p. 63 for the setting method.)
- If the same unit number is set for more than one Special I/O Unit, a fatal error (No. duplication error on CX-Programmer or Unit Number Duplication on Programming Console), and the PLC will not operate.

## DM Area Contents (Same for Run or Test Mode)

The following initial settings are set in the words allocated in the DM Area.

| DM Area address | | Bit No. | Type | Description | Setting | Reference |
|---|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | | |
| m | m+100 | 12 to 15 | System Settings | UID Addition Setting | 0: Disabled<br>1: Enabled | p. 93 |
| | | 08 to 11 | | Test Mode Disable Setting | 0: Enabled<br>1: Disabled | p. 93 |
| | | 04 to 07 | | Setting for Write Verification | 0: Verification<br>1: No verification | p. 94 |
| | | 00 to 03 | | RF Tag Communications Speed Setting | 0: Normal mode<br>1: High-speed mode | p. 94 |
| m+1 | m+101 | 00 to 15 | Auto Wait Time Setting | The RF Tag timeout time when the Communications Specification is single auto or repeat auto. An RF Tag Missing Error will be returned if this value is exceeded. | 0001 to 9999 (×0.1s)<br>0000: Infinite | p. 95 |
| m+2 | m+102 | 08 to 15 | Write Protection Disable Setting | Not used. | --- | --- |
| | | 00 to 07 | | Write Protection Disable (V680 method/Disabled/ V600 method) | 00: V680 method<br>01: Disabled<br>02: V600 method | p. 95 |
| m+3 | m+103 | 04 to 15 | Antenna Connection Setting | Not used. | --- | --- |
| | | 00 to 03 | | Antenna Connection | 0: Standard Antenna<br>1: V680-H01 | p. 96 |
| m+4 | m+104 | 04 to 15 | Results Monitor Output Setting | Not used. | --- | --- |
| | | 00 to 03 | | Results Monitor Output | 0: Communications time<br>1: Noise level | p. 96 |
| m+50 | --- | 08 to 15 | Test Settings (Both Antennas 1 and 2) | Test Operation | 00: Communications test<br>A0: Distance level<br>B0: Read speed level<br>B1: Write speed level<br>C0: Noise level<br>C1: Communications success rate | p. 97 |
| | | 00 to 07 | | Test Antenna | 01: Antenna 1<br>02: Antenna 2 | |
| m+51 | --- | 00 to 15 | | Number of Test Bytes | 0000 to 0800 hex (bytes) | |
| m+80 | --- | 04 to 15 | Run/Test Switching Method Setting (Both Antennas 1 and 2) | Not used. | --- | |
| | | 00 to 03 | | Run/Test Switching Method Setting | 0001: CPU Unit<br>0000: Test switch | |
| m+81 | --- | 04 to 15 | RF Tag Memory Setting (Both Antennas 1 and 2) | Not used. | --- | |
| | | 00 to 03 | | RF Tag Memory Setting | 0: Standard Mode<br>1: CA1D Mode | |
| m+90 | --- | 04 to 15 | Data Transfer Setting (Both Antennas 1 and 2) | Not used. | --- | p. 98 |
| | | 00 to 03 | | Data Transfer Setting | 0: Use cyclic transfer<br>1: Use Intelligent I/O Instructions | |

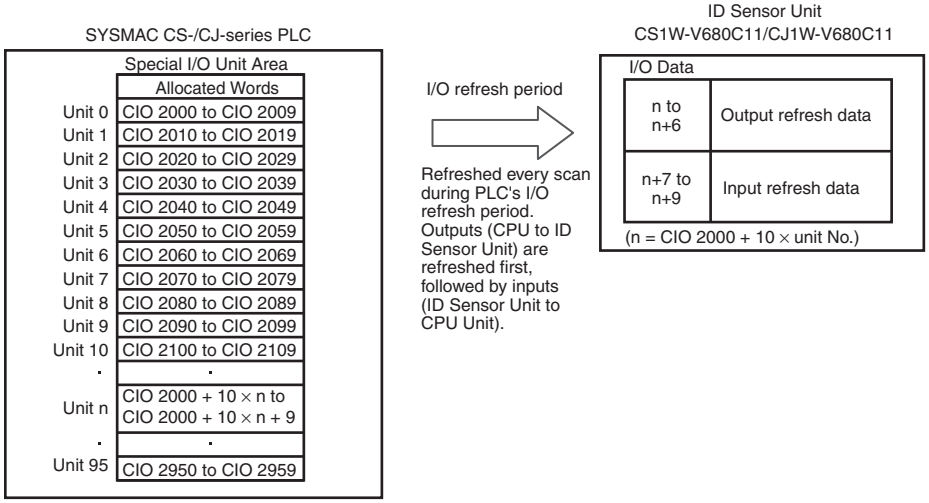
CHECK!

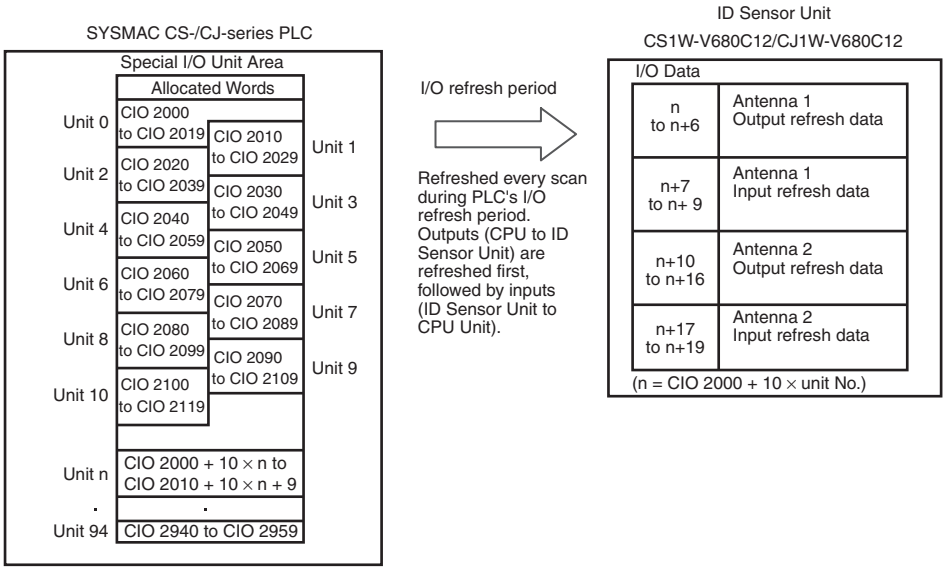
• First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number

# I/O Data Allocations

## Special I/O Unit Area Allocations and Contents

I/O data exchange for the ID Sensor Unit is performed using the words allocated to the ID Sensor Unit as a Special I/O Unit in the Special I/O Unit Area.


SYSMAC CS-/CJ-series PLC
Special I/O Unit Area
Allocated Words
Unit 0 CIO 2000 to CIO 2009
Unit 1 CIO 2010 to CIO 2019
Unit 2 CIO 2020 to CIO 2029
Unit 3 CIO 2030 to CIO 2039
Unit 4 CIO 2040 to CIO 2049
Unit 5 CIO 2050 to CIO 2059
Unit 6 CIO 2060 to CIO 2069
Unit 7 CIO 2070 to CIO 2079
Unit 8 CIO 2080 to CIO 2089
Unit 9 CIO 2090 to CIO 2099
Unit 10 CIO 2100 to CIO 2109
Unit n CIO 2000 + 10 × n to CIO 2000 + 10 × n + 9
Unit 95 CIO 2950 to CIO 2959
I/O refresh period
Refreshed every scan during PLC's I/O refresh period. Outputs (CPU to ID Sensor Unit) are refreshed first, followed by inputs (ID Sensor Unit to CPU Unit).
ID Sensor Unit
CS1W-V680C11/CJ1W-V680C11
I/O Data
n to n+6 Output refresh data
n+7 to n+9 Input refresh data
(n = CIO 2000 + 10 × unit No.)


SYSMAC CS-/CJ-series PLC
Special I/O Unit Area
Allocated Words
Unit 0 CIO 2000 to CIO 2019
Unit 1 CIO 2010 to CIO 2029
Unit 2 CIO 2020 to CIO 2039
Unit 3 CIO 2030 to CIO 2049
Unit 4 CIO 2040 to CIO 2059
Unit 5 CIO 2050 to CIO 2069
Unit 6 CIO 2060 to CIO 2079
Unit 7 CIO 2070 to CIO 2089
Unit 8 CIO 2080 to CIO 2099
Unit 9 CIO 2090 to CIO 2109
Unit 10 CIO 2100 to CIO 2119
Unit n CIO 2000 + 10 × n to CIO 2010 + 10 × n + 9
Unit 94 CIO 2940 to CIO 2959
I/O refresh period
Refreshed every scan during PLC's I/O refresh period. Outputs (CPU to ID Sensor Unit) are refreshed first, followed by inputs (ID Sensor Unit to CPU Unit).
ID Sensor Unit
CS1W-V680C12/CJ1W-V680C12
I/O Data
n to n+6 Antenna 1 Output refresh data
n+7 to n+ 9 Antenna 1 Input refresh data
n+10 to n+16 Antenna 2 Output refresh data
n+17 to n+19 Antenna 2 Input refresh data
(n = CIO 2000 + 10 × unit No.)

CHECK!

- The words allocated to the ID Sensor Unit in the Special I/O Unit Area are determined by the setting of the unit number switches on the Unit's front panel. Set unit numbers so that the same words are not allocated to more than one Unit. (Refer to p. 63 for the setting method.)
- If the same unit number is set for more than one Special I/O Unit, a fatal error (No. duplication error on CX-Programmer or Unit Number Duplication on Programming Console), and the PLC will not operate.

## Special I/O Unit Bit Allocations

The words in the Special I/O Unit Area are allocated as shown in the following table.

### ■ Outputs

| I/O | Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|---|
| | Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| Output | n | n+10 | 15 | Unit Controls | Run/Test Bit | Turn ON for Test Mode, turn OFF for Run Mode. (Enabled only when DM=m+80 is 0001.) |
| | | | 03 to 14 | | --- | Not used |
| | | | 02 | | Abort Bit | Execution is aborted if this bit is turned ON during command execution. If communications are aborted for an FIFO trigger communications specification, prohibiting communications with any RF Tags inside the communications range will be cleared. |
| | | | 01 | | Error Reset Bit | If this bit is turned ON while the ID Sensor Unit is waiting for the Command Execution Bit to be turned ON, the Results Information (CIO n+8) will be cleared. |
| | | | 00 | | Command Execution Bit | When this bit is turned ON, the ID Sensor Unit will interpret the command and start execution. |
| | n+1 | n+11 | 08 to 15 | Command | Command Code | Specify the command to be executed. |
| | | | 04 to 07 | | Communications Specification | Specify the communications method with the RF Tag. |
| | | | 00 to 03 | | Processing Specification | Specify details of command execution. |
| | n+2 | n+12 | 00 to 15 | | Processing Address | Specify the processing start address in the RF Tag. |
| | n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify the number of processing bytes in the RF Tag |
| | n+4 | n+14 | 00 to 15 | Data Storage Area | Data Storage Word Address (rightmost 4 digits) | Specify the storage word address in BCD. |
| | n+5 | n+15 | 12 to 15 | | Data Storage Area | Specify the data storage area. |
| | | | 08 to 11 | | Bank Specification | If the EM Area is specified, specify the bank number. |
| | | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | Specify the storage word address in BCD. |
| | n+6 | n+16 | 00 to 15 | Option | Command Option | Specify command option. |

CHECK!

• First word allocated to Unit in CIO Area: n = CIO 2000 + 10 × Unit number

### Command and Option Settings

| Command name | Type | Command | | | | | Option | Data stored in Data Storage Area (See note 4.) | Reference |
|---|---|---|---|---|---|---|---|---|---|
| | Word address | n+1 | | | n+2 | n+3 | n+6 | | |
| | Name | Command Code (hex) | Communications Specification (hex) (See note 2.) | Processing Specification (hex) (See note 3.) | Processing Address (hex) | Number of Processing Bytes (hex) | Command Option | | |
| Read | | 00 | 0: Trigger<br>1: Single auto<br>2: Repeat auto<br>3. FIFO trigger<br>4. FIFO repeat<br>5. Multi-access trigger<br>6. Multi-access repeat | Data storage order<br>0: Leftmost → Rightmost<br>1: Rightmost → Leftmost | 0000 to FFFF | 0001 to 0800 | --- | Read data | Page 126 |
| Write | | 01 | | | 0000 to FFFF | 0001 to 0800 | --- | Write data | Page 127 |
| Bit Set | | 02 | | | 0000 to FFFF | 0001 to 0004 | --- | Designation Data for Bit Set | Page 128 |
| Bit Clear | | 03 | | | 0000 to FFFF | 0001 to 0004 | --- | Designation Data for Bit Clear | Page 129 |
| Mask Bit Write | | 04 | | | 0000 to FFFF | --- | Designation Data for Mask 0000 to FFFE | Write data | Page 130 |
| Calculation Write | | 05 | | 0: Add<br>1: Subtract | 0000 to FFFF | 0001 to 0004 | Operation value 0000 to FFFF | Calculation result | Page 132 |
| Data Fill | | 06 | | 0: Bytes<br>1: Words | 0000 to FFFF | 0001 to 0800<br>0000: All | Fill data 0000 to FFFF | --- | Page 133 |
| Data Check | | 07 | 0: Trigger<br>1: Single auto | 0: Calculation<br>1: Verification | 0000 to FFFD | 0003 to 0800 | --- | --- | Page 134 |
| Number of Writes Control | | 08 | | 0: Add<br>1: Subtract | 0000 to FFFD | --- | No. to add 0000 to 00FF | Result of number of writes calculation | Page 135 |
| Copy (See note 1.) | | 09 | | --- | Read address 0000 to FFFF | 0001 to 0800 | Write address 0000 to FFFF | --- | Page 136 |
| Read with Error Correction | | 0A | 0: Trigger<br>1: Single auto<br>2: Repeat auto<br>3. FIFO trigger<br>4. FIFO reader<br>5. Multi-access trigger<br>6. Multi-access repeat | Data storage order<br>0: Leftmost → Rightmost<br>1: Rightmost → Leftmost | 0000 to FFFA | 0001 to 01FE | --- | Read data | Page 137 |
| Write with Error Correction | | 0B | | | 0000 to FFFA | 0001 to 01FE | --- | Write data | Page 138 |
| UID Read | | 0C | | | --- | --- | --- | Read data | Page 139 |
| Noise Measurement | | 10 | 0: Trigger | --- | --- | --- | --- | Measurement results | Page 140 |

**Note 1.** The Copy command cannot be used on the CS1W-V680C11/CJ1W-V680C11.

**2.** Refer to *Communications Specifications* for communications specifications.

p. 85

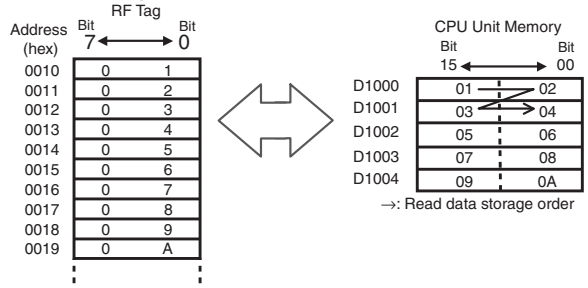
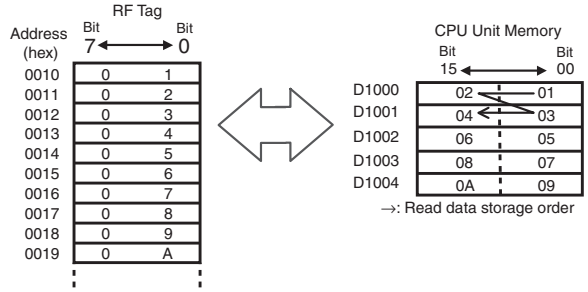
**3.** Refer to *Designating Processing Specifications* for designation methods.

p. 70

**4.** Refer to *Designating Data Storage Areas* for designation methods.

p. 70

## • Designating Processing Specifications

| Commands | Processing Specification |
|---|---|
| Read<br>Write<br>Bit Set<br>Bit Clear<br>Mask Bit Write<br>Read with Error Correction<br>Write with Error Correction<br>UID Read | 0: Leftmost to Rightmost<br>  <br><br>1: Rightmost to Leftmost<br>  <br> |
| Calculation Write<br>Number of Writes Control | 0: Add<br>1: Subtract |
| Data Fill | 0: Bytes (Rightmost 8 bits)<br>1: Words |
| Data Check | 0: Calculation (write)<br>1: Verification |

## • Designating Data Storage Areas

| Word address | | n+5 | | | n+4 |
|---|---|---|---|---|---|
| Bit No. | | 15 to 12 | 11 to 08 | 07 to 00 | 15 to 00 |
| Area | Specifiable range | Area specification | Bank specification | Address (leftmost 2 digits) | Address (rightmost 4 digits) |
| DM | D00000 to D32767 | 0 hex | Always 0 | 000000 to 032767 (BCD) | |
| CIO | CIO 0000 to CIO 6143 | 1 hex | Always 0 | 000000 to 006143 (BCD) | |
| WR | W000 to W511 | 2 hex | Always 0 | 000000 to 000511 (BCD) | |
| HR | H000 to H511 | 3 hex | Always 0 | 000000 to 000511 (BCD) | |
| AR | A000 to A959 | 4 hex | Always 0 | 000000 to 000959 (BCD) | |
| EM | E00000 to E32767 | 5 hex | 0 to C hex | 000000 to 032767 (BCD) | |
| TIM | T0000 to T4095 | 6 hex | Always 0 | 000000 to 004095 (BCD) | |
| CNT | C0000 to C4095 | 7 hex | Always 0 | 000000 to 004095 (BCD) | |

CHECK!

- If there is a mistake in designating the command and option, the Command Error Flag (CIO n+8, bit 00) in the Results Information will turn ON, and the command will not be executed.
- If there is a mistake in designating the data storage area, the Data Storage Area Specification Error Flag (CIO n+8, bit 01) in the Results Information will turn ON, and the command will not be executed.

## ■ Inputs

| I/O | Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|---|
| | Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| Input | n+7 | n+17 | 15 | Unit Status | Unit Busy Flag | Turns ON when there is an ID Sensor Unit error. |
| | | | 14 | | Test Mode Flag | Turns ON during Test Mode. |
| | | | 13 | | Antenna Power Supply Error Flag | Turns ON when there is an error in the Unit power supply or the external power supply. |
| | | | 12 | | Memory Error Flag | Turns ON when there is an error in ID Sensor Unit memory. |
| | | | 11 | | Antenna Error Flag | The DM Area setting and V680-H01 Antenna connection status do not match. Too many Antennas are connected or the specified power consumption has been exceeded. |
| | | | 03 to 10 | | --- | Not used |
| | | | 02 | | Error End Flag | Turns ON when there is an ID Sensor Unit error. |
| | | | 01 | | Normal End Flag | Turns ON for one scan when processing ends normally. |
| | | | 00 | | ID Busy Flag | Turns ON while communications are in progress. |

| I/O | Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|---|
| | Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| Input (cont'd) | n+8 | n+18 | 15 | Results Information | Antenna Error Flag (Error Code: 7C) | Turns ON when an error occurs because an Antenna is not connected.<br>Turns ON when the power is not correctly supplied to the Antenna. |
| | | | 14 | | Verification Error Flag (Error Code: 71) | Turns ON when data cannot be written correctly to the RF Tag (only when verification is specified). |
| | | | 13 | | RF Tags Address Error Flag (Error Code: 7A) | Turns ON when execution is not possible because the processing address is not specified correctly. |
| | | | 12 | | RF Tag Communications Error Flag (Error Code: 70) | Turns ON when communications cannot be completed normally because an error occurred in communications with the RF Tag. |
| | | | 11 | | Write Protection Error Flag (Error Code: 7D) | Turns ON when an attempt is made to write to a write-protected area.<br>Turns ON when the RF Tag is not an applicable model. |
| | | | 10 | | RF Tag Missing Error Flag (Error Code: 72) | Turns ON when the communications specification is designated as a trigger but there is no RF Tag in the Antenna's communications area.<br>Turns ON when there is no RF Tag in the Antenna's communications area before the Auto Wait Time elapses. |
| | | | 09 | | ID System Error 1 (Error Code: 79) | System error |
| | | | 08 | | ID System Error 2 (Error Code: 7E) | System error |
| | | | 07 | | ID System Error 3 (Error Code: 7F) | System error |
| | | | 05 to 06 | | --- | Not used |
| | | | 04 | | Status Flag (Error Code: 76) | Turns ON for a Calculation Write command if addition results in an overflow or subtraction results in an underflow.<br>Turns ON when a difference is found for the verification results for a Data Check command.<br>Turns ON when the specified number of writes is exceeded for a Number of Writes Control command.<br>Turns ON for a Copy command if an error occurs when writing after data has been read.<br>Turns ON when a 2-bit or larger memory error cannot be corrected by the Read with Error Correction command. |
| | | | 03 | | Error Correction Flag (Error Code: 77) | Turns ON when a 1-bit error correction was performed for a read error. |
| | | | 02 | | --- | Not used |
| | | | 01 | | Data Storage Area Specification Error Flag (Error Code: 14) | Turns ON when an illegal area is specified for the data storage area. |
| | | | 00 | | Command Error Flag (Error Code: 14) | Turns ON when there is an error in the setting for the Command, Communications Specification, Processing Address, or Number of Processing Bytes.<br>Turns ON when an attempt is made to execute the Copy command for the CS1W-V680C11/CJ1W-V680C11. |

| I/O | Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|---|
| | Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| Input (cont'd) | n+9 | n+19 | 00 to 15 | Monitor | Processing Results Monitor | ■ Run Mode<br>• Communications Time<br>Normal end:<br>Processing time (1 to 9999 x 10 ms)<br>Max. error: 10 ms<br>Error end: "E0" + "Error Code"<br>Other: "0000"<br>• Noise Level<br>Communications end: "C0" + "00" to "99"<br>Measurement error: "E0" + "Error Code"<br>Other: "0000"<br>■ Test Mode<br>Normal end: "Command code" + <Results><br>Error end: "E0" + "Error Code"<br>Other: "0000"<br>Cleared when the power supply is turned ON or command execution starts. |

## • Processing Results Monitor Data

Run Mode

| Word address | n+9 | | | |
|---|---|---|---|---|
| Bit No. | 15 to 12 | 11 to 08 | 07 to 04 | 03 to 00 |
| When the power supply is turned ON or communications are started | 0 | 0 | 0 | 0 |
| At a normal end | Processing time (1 to 9999 × 10 ms) (hex) or Noise level (C0000 to C099) | | | |
| At an error end | E | 0 | Error code | |

Communications Test Mode

| Word address | n+9 | | | |
|---|---|---|---|---|
| Bit No. | 15 to 12 | 11 to 08 | 07 to 04 | 03 to 00 |
| When the power supply is turned ON or communications are started | 0 | 0 | 0 | 0 |
| At a normal end | Processing time (1 to 9999 × 10 ms) (hex) | | | |
| At an error end | E | 0 | Error code | |

Distance Level Measurement

| Word address | n+9 | | | |
|---|---|---|---|---|
| Bit No. | 15 to 12 | 11 to 08 | 07 to 04 | 03 to 00 |
| At a normal end | A | 0 | Distance level measurement results (00 to 06) | |
| At an error end | E | 0 | Error code | |

CHECK!

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed. No matter which test is set, only the RF Tag communications test operation will be performed.

Read Speed Level Measurement

| Word address | n+9 | | | |
|---|---|---|---|---|
| Bit No. | 15 to 12 | 11 to 08 | 07 to 04 | 03 to 00 |
| When the power supply is turned ON or communications are started | 0 | 0 | 0 | 0 |
| At a normal end | B | 0 | Read speed level measurement results (EE, 01 to 06) | |
| At an error end | E | 0 | Error code | |

CHECK!

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed. No matter which test is set, only the RF Tag communications test operation will be performed.

Write Speed Level Measurement

| Word address | n+9 | | | |
|---|---|---|---|---|
| Bit No. | 15 to 12 | 11 to 08 | 07 to 04 | 03 to 00 |
| When the power supply is turned ON or communications are started | 0 | 0 | 0 | 0 |
| At a normal end | B | 1 | Write speed level measurement results (EE, 01 to 06) | |
| At an error end | E | 0 | Error code | |

CHECK!

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed. No matter which test is set, only the RF Tag communications test operation will be performed.

Noise Level

| Word address | n+9 | | | |
|---|---|---|---|---|
| Bit No. | 15 to 12 | 11 to 08 | 07 to 04 | 03 to 00 |
| At a normal end | C | 0 | Noise level measurement results (00 to 99) | |
| At an error end | E | 0 | Error code | |

CHECK!

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed. No matter which test is set, only the RF Tag communications test operation will be performed.

Read Communications Success Rate Measurement

| Word address | n+9 | | | |
|---|---|---|---|---|
| Bit No. | 15 to 12 | 11 to 08 | 07 to 04 | 03 to 00 |
| At a normal end | C | 1 | Communications success rate measurement results (EE, 01 to 99) (100%: FF) | |
| At an error end | E | 0 | Error code | |

CHECK!

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed. No matter which test is set, only the RF Tag communications test operation will be performed.

## • Error Codes

| Error classification | Error Codes | Error |
|---|---|---|
| Communications error with RF Tag | 7C | Antenna error |
| | 71 | Verification error |
| | 7A | RF Tag address error |
| | 70 | RF Tag communications error |
| | 7D | Write protect error |
| | 72 | RF Tag missing error |
| | 79 | ID system error 1 |
| | 7E | ID system error 2 |
| | 7F | ID system error 3 |
| | 76 | Status error |
| | 77 | Error corrected |
| Host communications error | 14 | Data storage area specification error, command error |

MEMO

# SECTION 5
# ID Sensor Unit Functions


| | |
|---|---|
| Operating Modes | 78 |
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| Write Protection | 101 |
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# Operating Modes

The ID Sensor Unit has two operating modes: Run Mode and Test Mode
There are two ways to switch between the two operating modes.

1. The test switch on the Unit's front panel
2. A software switch in memory

## Run Mode

In Run Mode, communications are performed when the Command Execution Bit (CIO n, bit 0) in the Special I/O Unit Area is turned ON. All commands can be used in this mode. Communications results and Unit status are shown on the status indicators and in the Unit Status (CIO n+7), Results Information (CIO n+8), and Processing Results Monitor (CIO n+9) in the Special I/O Unit Area.

## Test Mode

Test Mode is used to simulate actual operation. By using Test Mode, communications capability can be measured easily in the actual operating environment. Test Mode is also useful for checking the installation and checking the system while it is operating. The following five operations can be performed in Test Mode.

| Operation | Description |
|---|---|
| RF Tag communications test | Executes communications with an RF Tag and outputs the results to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. When using a Two-channels ID Sensor Unit, the test will be performed alternately for Antennas 1 and 2. |
| Distance level measurement | Measures the Antenna and RF Tag installation distance in relation to the RF Tag communications range. The measurement results are output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. The results can also be checked on the Amplifiers operation indicators. |
| Write/read speed level measurement | Measures the number of times that communications can be performed consecutively based on the speed that RF Tags pass through the Antenna communications range. The measurement results are output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. The results can also be checked on the Amplifiers operation indicators. |
| Noise level measurement | Measures the ambient noise level in the installation environment. The measurement results are output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. |
| Communications success rate measurement | Communicates 100 times with an RF Tag with no retries. The measurement results are output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. |

CHECK!

When a V680-H01 Antenna is connected, tests other than the communications test cannot be performed. No matter which test is set, only the RF Tag communications test operation will be performed.

CHECK!

- If the ID Sensor Unit is changed to Test Mode while a command is being executed, command execution will be completed and then Test Mode will be entered.
- If an ID Sensor Unit error occurs, communications will stop regardless of the operating mode.
- First word allocated to Unit in CIO Area: n = CIO 2000 + 10 × Unit number

## ■ Using the Test Mode

### 1. Set the operation in Test Mode

The operation to be performed in Test Mode is set in the DM Area. The settings are listed in the following table.

| | |
|---|---|
| Test Operation | • Communications test<br>• Distance level<br>• Read speed level<br>• Write speed level<br>• Noise level<br>• Communications success rate |
| Test Antenna | • Antenna 1<br>• Antenna 2 |
| Number of Test Bytes | 0000 to 0800 hex (bytes) |
| Run/Test Switching Method | • CPU Unit<br>• Test switch |

CHECK! For details on the settings for the operation in Test Mode, refer to *Test Settings* and *Run/Test Switching Method Setting*.

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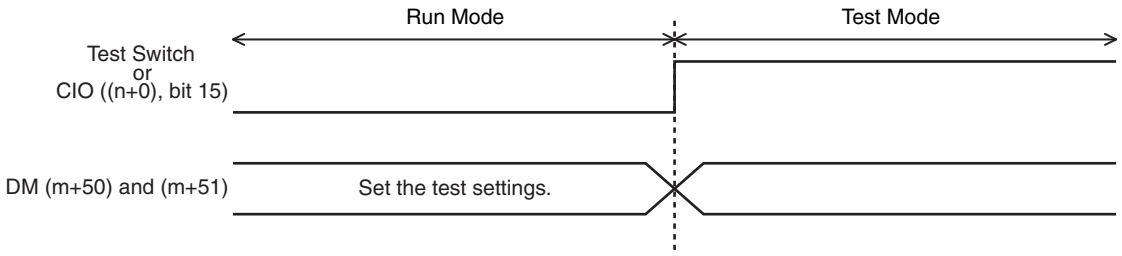
### 2. Turn ON the test switch.

The Test Operation is started using the method set in the DM Area

CHECK! To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of CIO n+0, set DM m+80 to 0001.

CHECK! The test that is performed cannot be changed after entering Test Mode, even if the test settings in DM m+50 and DM m+51 are changed. Always set the test settings in DM m+50 and DM m+51 before entering Test Mode.



## ■ Communications Test

A communications test is used to execute communications with an RF Tag and output the communications results to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. When using a Two-channels ID Sensor Unit, RF Tag communications are executed alternately for Antennas 1 and 2.

CHECK!

The communications test checks only the read operation and does not check the write operation.

CHECK!

The communications test will be performed with the contents that was set in advance in DM m+50 and DM m+51. In the communications test, communications are executed alternatively for Antennas 1 and 2, regardless of the specified Antenna number.

---

**1.** Set the method to use to switch between Run Mode and Test Mode.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of CIO n+0, set DM m+80 to 0001.

CHECK!

After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

**2.** Set the operation to perform in Test Mode.

Set DM m+50 to 0000 and set the number of test bytes in DM m+51.

CHECK!

DM Area addresses are given in reference to “m,” where m = D20000 + 100 × Unit number.

**3.** Turn ON the test switch.

The operation in Test Mode is started using the method set in the DM Area.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of (CIO n+0), set DM m+80 to 0001.

**4.** Communications with the RF Tag will begin.

Communications will be performed with the RF Tag and the communications results will be output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area.

## ■ Distance Level Measurement

A distance level measurement allows for easy checking of the installation positions of Antennas and RF Tags.

This test operation measures the Antenna and RF Tag installation distance in relation to the RF Tag communications range. The measurement results are output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. The measurement results can also be checked on the Amplifiers operation indicators.

CHECK!

The distance level changes dramatically depending on the ambient environment. Use it as a guide for the installation position and test operation sufficiently in Run Mode using the actual installation environment. Levels higher than distance level 4 may not be displayed, but this does not indicate an error and performance in Run Mode will not be affected.

CHECK!

The communications test will be performed with the contents that was set in advance in DM m+50 and DM m+51.

---

**1.** Set the method to use to switch between Run Mode and Test Mode.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of CIO n+0, set DM m+80 to 0001.

CHECK!

After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

**2.** Set the operation to perform in Test Mode.

Set DM m+50 to A00X and set the number of test bytes in DM m+51.
Note: Set X to 1 to specify Antenna 1, and set X to 2 to specify Antenna 2.

CHECK!

DM Area addresses are given in reference to “m,” where m = D20000 + 100 × Unit number.

**3.** Turn ON the test switch.

Measuring the distance level is started using the method set in the DM Area.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of CIO n+0, set DM m+80 to 0001.

**4.** Distance level measurement will begin.

The distance level will be measured, and the communications results will be output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. The measurement results can also be checked on the Amplifier's operation indicators.

## ■ Write/Read Speed Level Measurement

A speed level measurement allows for easy checking of the RF Tag's speed of movement and number of usable bytes. This operation measures the number of times that communications can be performed consecutively based on the speed that RF Tags pass through the Antenna communications range and outputs the measurement results to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. The measurement results can also be checked on the Amplifier's operation indicators.

CHECK!

The speed level measurement operation simulates writing data. Data is not actually written to the RF Tag.

CHECK!

The speed level measurement will be performed with the contents that was set in advance in DM m+50 and DM m+51.

---

**1.** Set the method to use to switch between Run Mode and Test Mode.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of (CIO n+0), set DM m+80 to 0001.

CHECK!

After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

**2.** Set the operation to perform in Test Mode.

Set DM m+50 to B00X (read) or B10X (write), and set the number of test bytes in DM m+51.
Note: Set X to 1 to specify Antenna 1, and set X to 2 to specify Antenna 2.

CHECK!

DM Area addresses are given in reference to “m,” where m = D20000 + 100 × Unit number.

**3.** Turn ON the test switch.

Measuring the speed level is started using the method set in the DM Area.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of (CIO n+0), set DM m+80 to 0001.

**4.** Speed level measurement will begin.

The speed level will be measured, and the communications results will be output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area. The measurement results can also be checked on the Amplifier's operation indicators.

## ■ Noise Level Measurement

A noise level measurement enables checking for spatial noise, noise sources, and the effectiveness of noise countermeasures.

This operation measures the ambient noise level in the installation environment and outputs the measurement results to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area.

CHECK!

The noise level measurement will be performed with the contents that was set in advance in DM m+50 and DM m+51.

---

**1.** Set the method to use to switch between Run Mode and Test Mode.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of (CIO n+0), set DM m+80 to 0001.

CHECK!

After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

**2.** Set the operation to perform in Test Mode.

Set DM m+50 to C00X.
Note: Set X to 1 to specify Antenna 1, and set X to 2 to specify Antenna 2.

CHECK!

DM Area addresses are given in reference to “m,” where m = D20000 + 100 × Unit number.

**3.** Turn ON the test switch.

Measuring the noise level is started using the method set in the DM Area.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of (CIO n+0), set DM m+80 to 0001.

**4.** Noise level measurement will begin.

The noise level will be measured, and the communications results will be output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area.

## ■ Communications Success Rate Measurement

The communications success rate measurement is used to check the communications success rate. The ID Sensor Unit communicates 100 times with a RF Tag and outputs the measurement results to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area.

CHECK!

The communications success rate is measured using read operations.

CHECK!

The communications success rate measurement will be performed with the contents that was set in advance in DM m+50.

---

**1.** Set the method to use to switch between Run Mode and Test Mode.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of (CIO n+0), set DM m+80 to 0001.

CHECK!

After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

**2.** Set the operation to perform in Test Mode.

Set DM m+50 to C10X and set the number of test bytes in DM m+51.
Note: Set X to 1 to specify Antenna 1, and set X to 2 to specify Antenna 2.

CHECK!

DM Area addresses are given in reference to “m,” where m = D20000 + 100 × Unit number.

**3.** Turn ON the test switch

Measuring the communications success rate is started using the method set in the DM Area.

CHECK!

To start Test Mode using the switch on the front of the Unit, set DM m+80 to 0000.
To start Test Mode using bit 15 of (CIO n+0), set DM m+80 to 0001.

**4.** Communications success rate measurement will begin.

The communications success rate will be measured and the measurement results will be output to the Processing Results Monitor (CIO n+9) in the Special I/O Unit Area.

# Communications Specifications

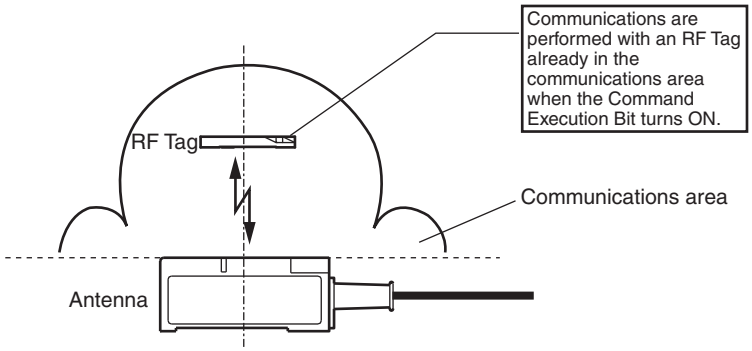
There are seven execution sequences that can be used to communicate with the RF Tag. The sequence is specified in the Communications Specification (CIO n+1, bits 04 to 07) in the command settings in the Special I/O Unit Area.

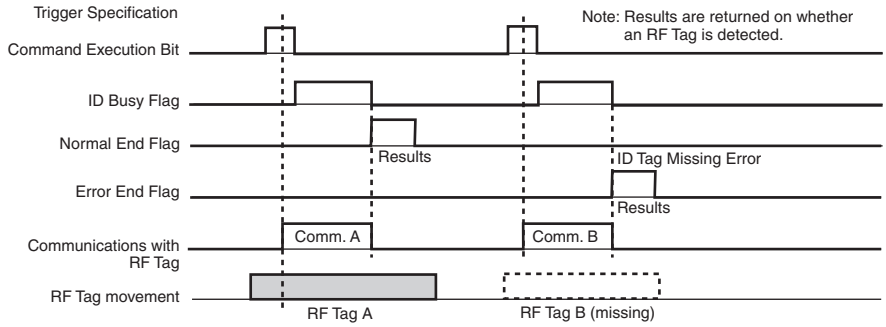
| Name | Communications specification | Description |
|---|---|---|
| Trigger | 0 | When the Command Execution Bit turns ON, communications are performed with the RF Tag in the communications area and processing is ended. |
| Single auto | 1 | After the Command Execution Bit turns ON, the ID Sensor Unit waits until an RF Tag is detected in the communications area, communications are performed, and processing is ended. |
| Repeat auto | 2 | The operation for a single auto specification is repeated. Once communications have been completed with a specific RF Tag, communications will not be performed with it again even if it remains in the communications area. Processing is ended when the Abort Bit is turned ON. |
| FIFO trigger (See note) | 3 | When the ID Sensor Unit receives a command, it communicates with an RF Tag and returns a response. After communicating, all further operations with that RF Tag are prohibited. The ID Sensor Unit communicates with only one RF Tag in the communications area. If an RF Tag that has been communicated with for a trigger specification is within the communications area, the ID Sensor Unit will not communicate with it a second time. |
| FIFO repeat (See note) | 4 | When the ID Sensor Unit receives a command, it waits until an RF Tag is detected within the communications area, then returns a response. After communicating, all further operations with that RF Tag are prohibited. After returning the response, the ID Sensor Unit again waits for an RF Tag to approach it, and continues repeating the operation until the Abort Bit turns ON. |
| Multi-access trigger (See note) | 5 | When the ID Sensor Unit receives a command, it communicates with all RF Tags in the communications area, returns responses in order. After communicating, all further operations with those RF Tags are prohibited. If there are no RF Tags in the communications area, the ID Sensor Unit will return an RF Tag missing error. |
| Multi-access repeat (See note) | 6 | When the ID Sensor Unit receives a command, it waits for RF Tags to approach it. It communicates with each RF Tag in the communications area, and returns responses in order. After communicating, all further operations with those RF Tags are prohibited. After returning the responses, the ID Sensor Unit again waits for RF Tags to approach it, and continues repeating the operation until the Abort Bit turns ON. |

**Note:** FIFO trigger, FIFO repeat, Multi-access trigger, and Multi-access repeat specification cannot be used for communicating with V680-D1KP□□ RF Tags.

## Trigger

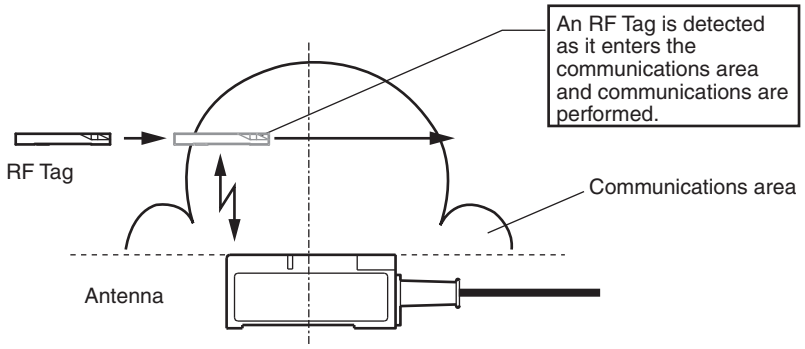
When a trigger is specified, communications are performed with the RF Tag when the Command Execution Bit (CIO n, bit 0) in the Special I/O Unit Area turns ON and command execution is ended when communications have been completed. If there is no RF Tag in the communications area when the Command Execution Bit turns ON, RF Tag Missing Error Flag (CIO n+8, bit 10) in the Results Information in the Special I/O Unit Area will turn ON and an error code (E072) will be stored in the Processing Results Monitor (CIO n+9). Use a sensor or other method to detect the presence of an RF Tag before turning ON the Command Execution Bit.

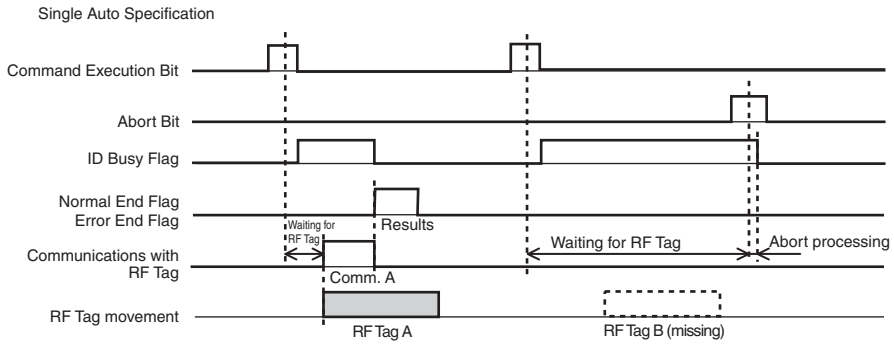

Communications are performed with an RF Tag already in the communications area when the Command Execution Bit turns ON.
RF Tag
Communications area
Antenna



## Single Auto

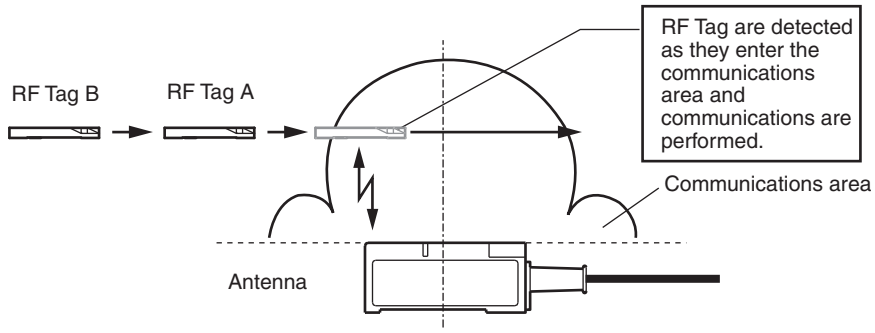
With a single auto specification, the presence of an RF Tag is automatically detected, and communications are performed, eliminating the need for detecting the RF Tag as is required for a trigger specification. Command execution is ended as soon as communications are completed with one RF Tag. Execution can also be ended by turning ON the Abort Bit (CIO n, bit 02) while the ID Sensor Unit is waiting for the RF Tag.

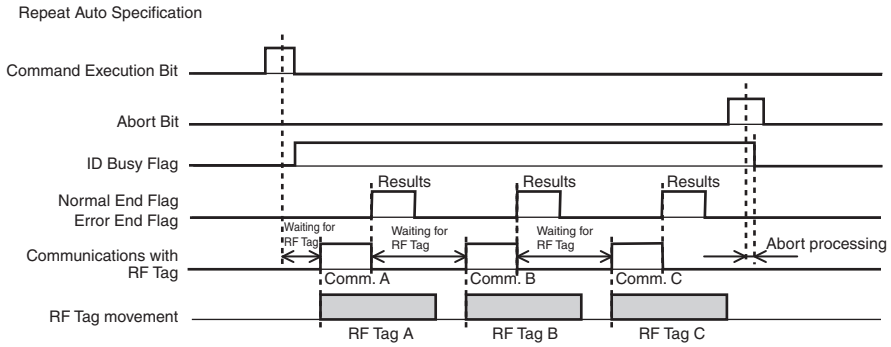

An RF Tag is detected as it enters the communications area and communications are performed.
RF Tag
Communications area
Antenna



## Repeat Auto

With a repeat auto specification, the presence of an RF Tag is automatically detected, and communications are performed, eliminating the need for detecting the RF Tag as is required for a trigger specification. As opposed to a single auto specification, command execution is not ended when communications with the first RF Tag have been completed, rather the ID Sensor Unit waits for the next RF Tag. Once communications have been completed with a specific RF Tag, communications will not be performed with it again even if it remains in the communications area. Repeat Auto execution can also be ended by turning ON the Abort Bit (CIO n, bit 02).

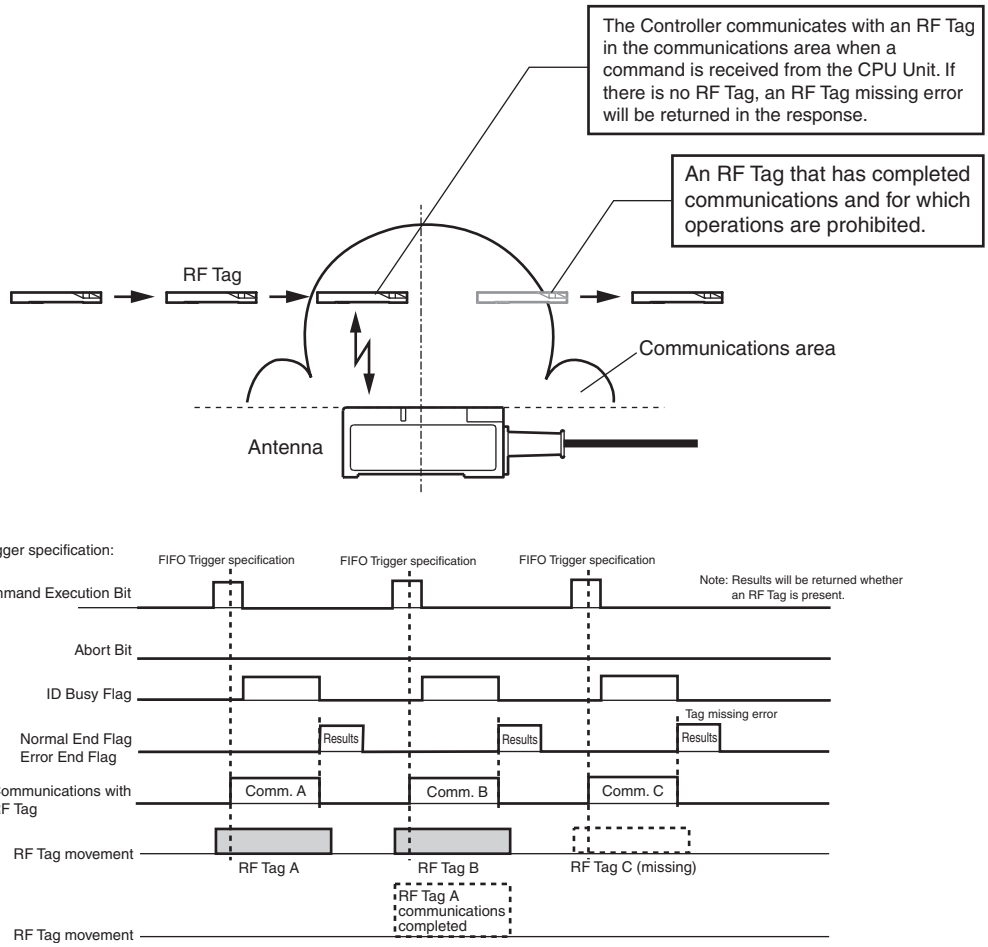

RF Tag B
RF Tag A
RF Tag are detected as they enter the communications area and communications are performed.
Communications area
Antenna



# FIFO Trigger

With a FIFO trigger communications specification, communications are executed with a RF Tag when a command is sent. After communicating, the ID Sensor Unit returns a response. Operations are prohibited for RF Tags that have completed communications until they leave the communications area. After the ID Sensor Unit sends a response, it will wait for the next command. If there is no RF Tag in the communications area when the ID Sensor Unit receives the command from the CPU Unit, the ID Sensor Unit will return an RF Tag missing error.

With the FIFO trigger communications specification, even if there are RF Tags in the communications area that have completed communications, the ID Sensor Unit can still communicate with the next RF Tag. (Commands will be accepted for an Antenna that is not processing a command.)


The Controller communicates with an RF Tag in the communications area when a command is received from the CPU Unit. If there is no RF Tag, an RF Tag missing error will be returned in the response.
An RF Tag that has completed communications and for which operations are prohibited.
RF Tag
Communications area
Antenna
FIFO Trigger specification:
FIFO Trigger specification
FIFO Trigger specification
FIFO Trigger specification
Note: Results will be returned whether an RF Tag is present.
Command Execution Bit
Abort Bit
ID Busy Flag
Tag missing error
Normal End Flag
Error End Flag
Results
Results
Results
Communications with RF Tag
Comm. A
Comm. B
Comm. C
RF Tag movement
RF Tag A
RF Tag B
RF Tag C (missing)
RF Tag A communications completed
RF Tag movement

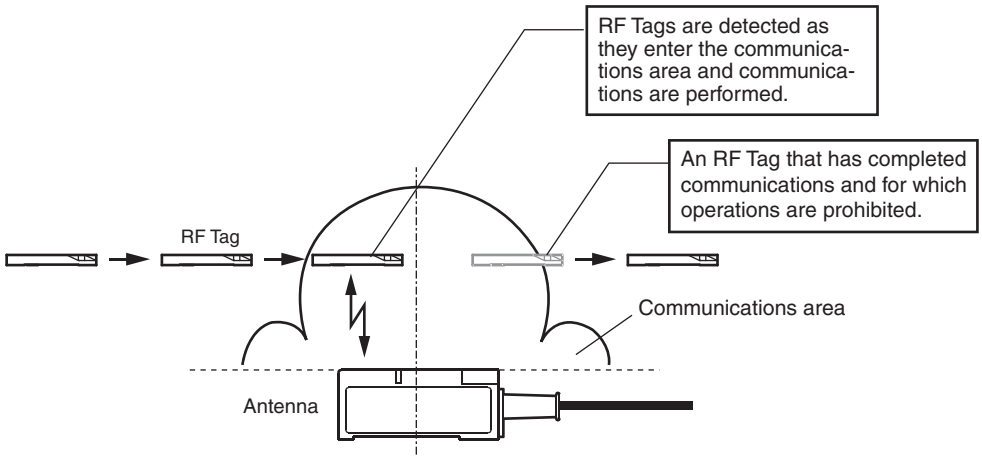
CHECK! To communicate with RF Tags in the communications area that have completed communications, turn ON the Abort Bit in the Special I/O Unit Area (CIO n, bit 02) to cancel processing.

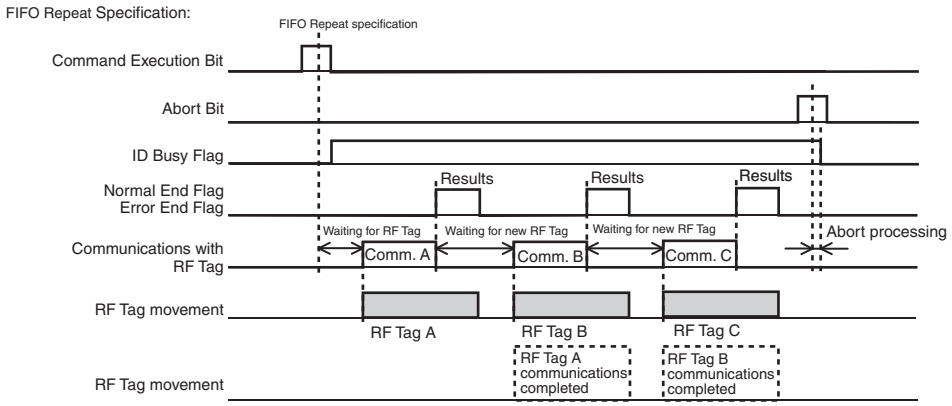
CHECK! When using the V680-D2KF□□/-D□KF68 with a FIFO trigger specification, the normal communications speed will be used regardless of the setting in DM m+0.

CHECK! FIFO trigger specification cannot be used for communicating with V680-D1KP□□ RF Tags.

# FIFO Repeat

With a FIFO repeat communications specification, the ID Sensor Unit automatically detects RF Tags that enter the communications area after a command is sent and communicates with them repeatedly. Operations are prohibited for RF Tags that have completed communications until they leave the communications area. After communicating, the ID Sensor Unit returns a response. ID Sensor Unit processing ends when the Abort Bit is turned ON. The ID Sensor Unit will wait for the next command. With the FIFO repeat communications specification, even if there are RF Tags in the communications area that have completed communications, the ID Sensor Unit can still communicate with the next RF Tag. (Commands will be accepted for an Antenna that is not processing a command.)


RF Tags are detected as they enter the communications area and communications are performed.
An RF Tag that has completed communications and for which operations are prohibited.
RF Tag
Communications area
Antenna




CHECK!

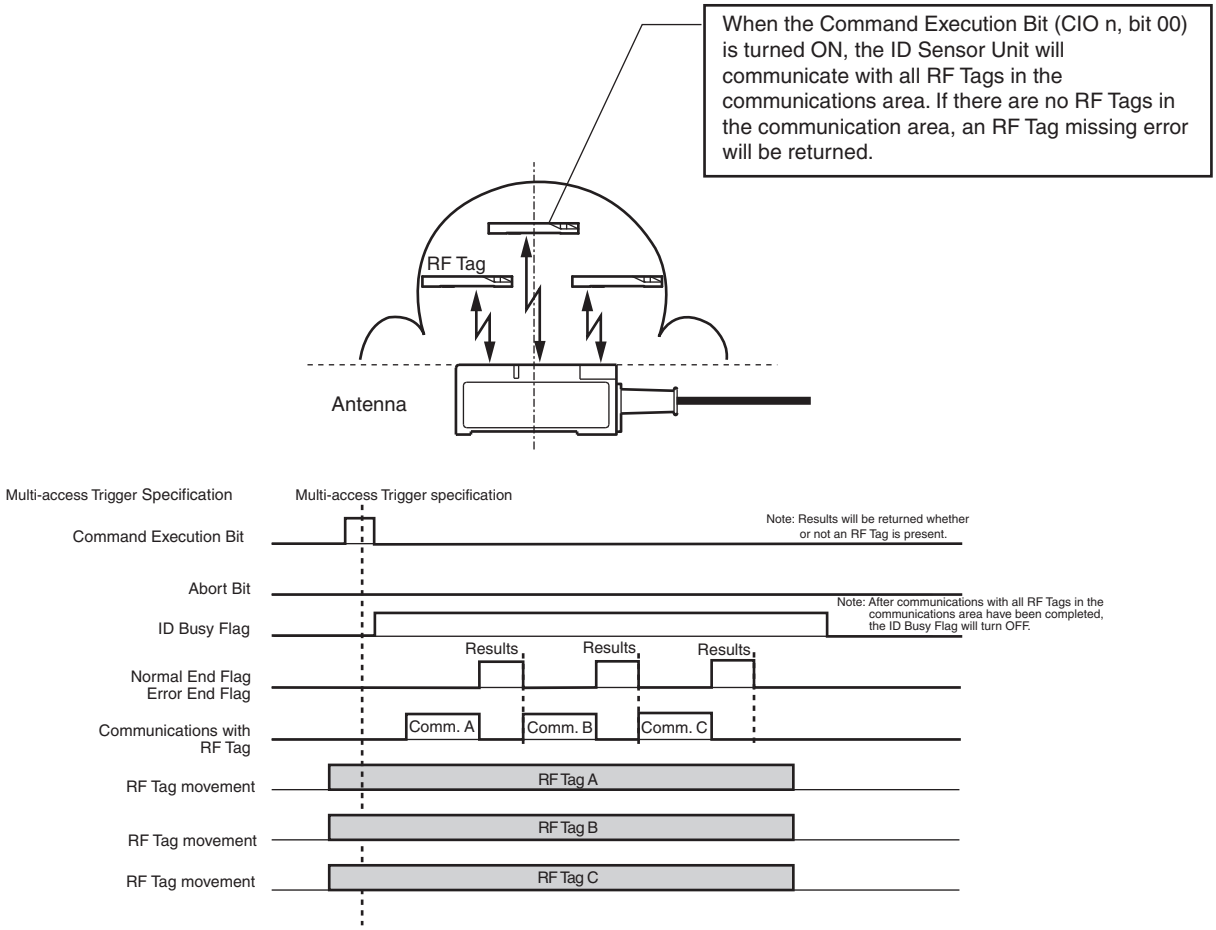
When using the V680-D2KF□□/-D□KF68 with a FIFO repeat specification, the normal communications speed will be used regardless of the setting in DM m+0.

CHECK!

FIFO repeat specification cannot be used for communicating with V680-D1KP□□ RF Tags.

# Multi-access Trigger

With a multi-access trigger communications specification, communications are executed with multiple RF Tags when a command is sent. The ID Sensor Unit sends responses sequentially as communications with the RF Tags in the communications area are completed. Move the results data stored in the Data Storage Area to another area before the results data from the next RF Tag is stored. After the ID Sensor Unit has completed communications with all of the RF Tags in the communications area, the ID Busy Flag will turn OFF, and the ID Sensor Unit will wait for the next command. (Commands will be accepted for an Antenna that is not processing a command.)


When the Command Execution Bit (CIO n, bit 00) is turned ON, the ID Sensor Unit will communicate with all RF Tags in the communications area. If there are no RF Tags in the communication area, an RF Tag missing error will be returned.
RF Tag
Antenna
Multi-access Trigger Specification
Multi-access Trigger specification
Command Execution Bit
Note: Results will be returned whether or not an RF Tag is present.
Abort Bit
ID Busy Flag
Note: After communications with all RF Tags in the communications area have been completed, the ID Busy Flag will turn OFF.
Results
Results
Results
Normal End Flag
Error End Flag
Communications with RF Tag
Comm. A
Comm. B
Comm. C
RF Tag movement
RF Tag A
RF Tag movement
RF Tag B
RF Tag movement
RF Tag C

CHECK!

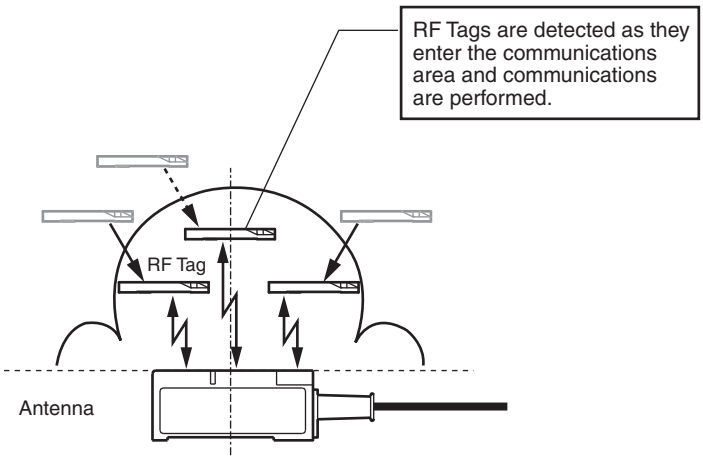
When using the V680-D2KF□□/-D□KF68 with a multiple-access trigger specification, the normal communications speed will be used regardless of the setting in DM m+0.

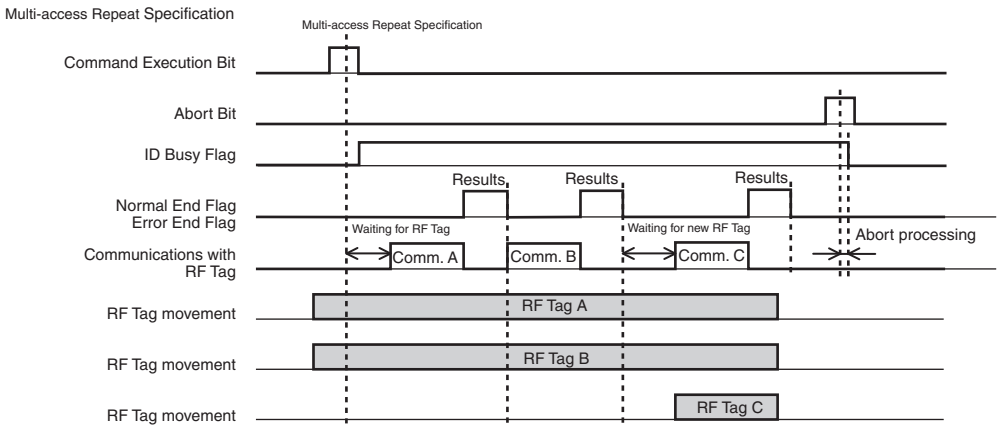
CHECK!

Multi-access trigger specification cannot be used for communicating with V680-D1KP□□ RF Tags.

# Multi-access Repeat

With a multi-repeat communications specification, the ID Sensor Unit automatically detects multiple RF Tags that enter the communications area and communicates with them repeatedly when a command is sent. The ID Sensor Unit sends responses sequentially as communications with the RF Tags in the communications area are completed. Move the results data stored in the data storage area to another area before the results data from the next RF Tag is stored. Even after the ID Sensor Unit has sent the responses, the ID Sensor Unit continues to automatically detect RF Tags that enter the communications area and communicates with them repeatedly. Operations are prohibited for RF Tags that have completed communications until they leave the communications area. ID Sensor Unit processing ends when the Abort Bit is turned ON. The ID Sensor Unit will wait for the next command. (Commands will be accepted for an Antenna that is not processing a command.)




CHECK!

When using the V680-D2KF□□/-D□KF68 with a multi-access repeat specification, the normal communications speed will be used regardless of the setting in DM m+0.

CHECK!

Multi-access repeat specification cannot be used for communicating with V680-D1KP□□ RF Tags.

# Parameter Settings in DM Area

The following parameter settings can be adjusted to the user application to optimize the performance and reliability of the ID Sensor Unit.

- System Settings
- Auto Wait Time Setting
- Write Protection Disable Setting
- Antenna Connection Setting
- Results Monitor Output Setting
- Test Settings
- Run/Test Switching Method Setting

Although the default settings can be used for most applications without any problems, the parameters can be changed to optimize the system.

## System Settings

### ■ UID Addition Setting

These settings are used to set whether or not a UID will be added to the read command response.

| DM Area address | | Bit No. | Description | | Default |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| m | m+100 | 12 to 15 | 0 | UID not added | 0 (Not added) |
| | | | 1 | UID added | |

**Note:** If adding the UID is specified, the UID (8 bytes) will be appended to the front of the read response data.

CHECK!

If using Intelligent I/O Instructions is specified as the data transfer method, set the IORD service control information area address information in D00004 to D00007 to 1. The first four words of data will be the UID data.

### ■ Test Mode Disable Setting

This setting can be used to disable entering Test Mode using the test switch on the front panel of the ID Sensor Unit. The test switch can be disabled to prevent accidentally entering Test Mode.

| DM Area address | | Bit No. | Description | | Default |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| m | m+100 | 08 to 11 | 0 | Test switch enabled. | 0 (Enabled) |
| | | | 1 | Test switch disabled (always Run Mode). | |

## ■ Verification Setting

Verification can be enabled for write operations, or verification can be disabled to shorten the communications time. The verification setting is valid for all commands except for Read and Data Check with a processing specification of verification.

| DM Area address | | Bit No. | Description | | Default |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| m | m+100 | 04 to 07 | 0 | Verify write operations. | 0 (Verification) |
| | | | 1 | Do not verify write operations. | |

## ■ Communications Speed Setting

High-speed communications can be set whenever the communications method is set to trigger, single auto, or repeat auto.

| DM Area address | | Bit No. | Description | | Default |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| m | m+100 | 00 to 03 | 0 | Communications speed setting: Normal | 0 (normal) |
| | | | 1 | Communications speed setting: High speed | |

CHECK!

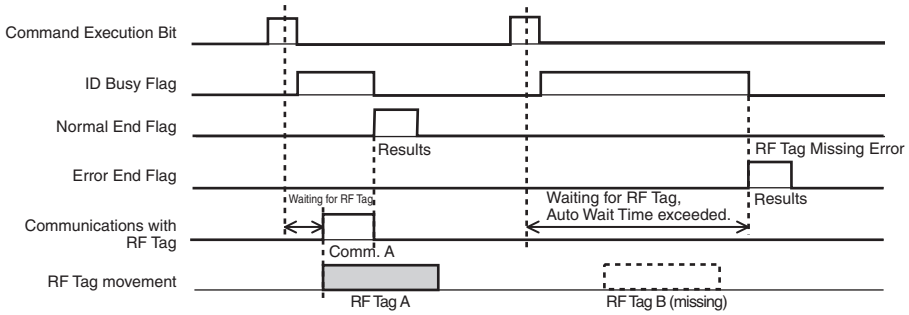
• First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number

CHECK!

After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

## Auto Wait Time Setting

If a normal response is not received in communications with an RF Tag when the RF Tag has been detected, retry processing will be performed to resend the same command. Retry processing is performed until the Auto Wait Time has expired while the ID Sensor Unit is waiting for an RF Tag. The RF Tag wait status begins for a single auto specification, when command execution is started. From the second RF Tag for a repeat auto specification, it begins when communications with the previous RF Tag have been completed.




| DM Area address | | Bit No. | Type | Description | Default |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| m+1 | m+101 | 00 to 15 | 0000 to 9999 | 1 to 9999 × 0.1 s<br>0: Infinite (Time not monitored) | 0<br>(Infinite) |

CHECK! • First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number

CHECK! After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

## Write Protection Disable Setting

The write protection disable setting can be used to disable the write protection settings in RF Tags.

| DM Area address | | Bit No. | Description | | Default |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| m+2 | m+102 | 00 to 07 | 00 | Write protection enabled using V680 method | 00 (Write protection enabled using V680 method) |
| | | | 01 | Write protection disabled. | |
| | | | 02 | Write protection enabled using V600 method | |

CHECK! First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number

CHECK! After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

## Antenna Connection Setting

The Antenna connection setting can be used to set whether or not a V680-H01 Antenna is connected to the ID Sensor Unit.

| DM Area address | | Bit No. | Description | | Default |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| m+3 | m+103 | 00 to 03 | 0 | Standard Antenna connected. | 0 (Standard) |
| | | | 1 | V680-H01 Antenna connected. | |

CHECK! First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number

CHECK! After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

CHECK! The V680-H01 Antenna can be connected to only a One-channel ID Sensor Unit. It cannot be connected to a Two-channels ID Sensor Unit.

## Results Monitor Output Setting

| DM Area address | | Bit No. | Description | | Default |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| m+4 | m+104 | 00 to 03 | 0 | Communications time | 0 (communi-cations time) |
| | | | 1 | Noise level | |

CHECK! First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number

CHECK! After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

## Test Settings

The test settings are used to set the operation, Antenna, and number of test bytes used in Test Mode.

| DM Area address | Bit No. | Type | Description | Setting value |
|---|---|---|---|---|
| m+50 | 08 to 15 | Test Settings (Both Antennas 1 and 2) | Test Operation | 00: Communications test<br>A0: Distance level<br>B0: Read speed level<br>B1: Write speed level<br>C0: Noise level<br>C1: Communications success rate |
| | 00 to 07 | | Test Antenna | 01: Antenna 1<br>02: Antenna 2 |
| m+51 | 00 to 15 | | Number of Test Bytes | 0000 to 0800 hex (bytes) |

CHECK!

First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number

## Run/Test Switching Method Setting

You can switch between Run Mode and Test Mode by using the test switch or by using bit 15 of CIO n+0.

| DM Area address | Bit No. | Type | Description | Set value |
|---|---|---|---|---|
| m+80 | 00 to 03 | Run/Test Switching Method Setting (Both Antennas 1 and 2) | Run/Test Switching Method Setting | 1: CPU Unit<br>0: Test switch |

CHECK!

First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number

CHECK!

After setting DM Area data with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The DM Area settings will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

## RF Tag Memory Setting

This setting can be used to set the RF Tag memory map to the map that is used with ID Controllers for Heat-resistant RFID Systems (V680-CA1D/-CA2D).

| DM Area address | Bit No. | Type | Description | Set value |
|---|---|---|---|---|
| m+81 | 00 to 03 | RF Tag Memory Setting (Both Antennas 1 and 2) | RF Tag Memory Setting | 1: CA1D Mode<br>0: Standard Mode |

## Data Transfer Setting

The data transfer method for the Read, Write, Read with Error Correction, and Write with Error Correction command can be set to cyclic transfer or to the IORD/IOWR instructions.
Cyclic data transfers will be used for all other commands regardless of the setting of the data transfer method. If the IORD/IOWR instructions are executed to transfer data when cyclic data transfer is specified, data will not be transferred and an error will occur.

| DM Area address | Bit No. | Type | Description | Set value |
|---|---|---|---|---|
| m+90 | 00 to 03 | Data Transfer Setting (Both Antennas 1 and 2) | Data Transfer Setting | 0: Use cyclic transfer<br>0: Use Intelligent I/O Instructions |

CHECK!

First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number.

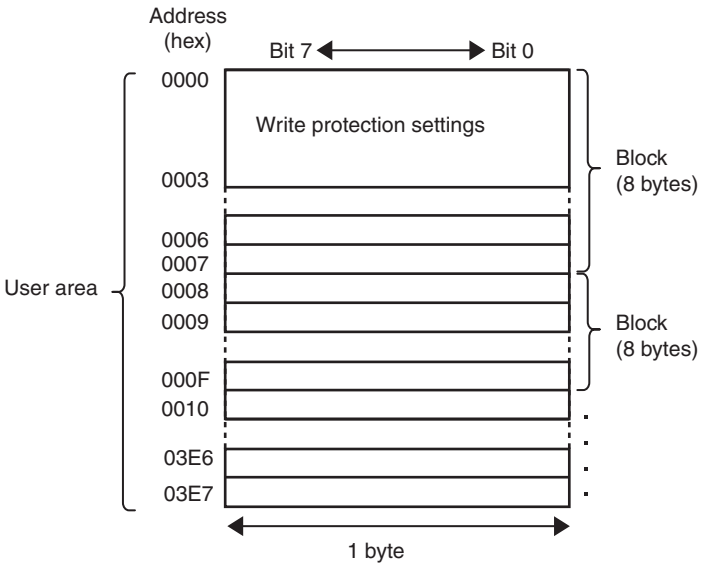
CHECK!

After setting word m+90 in the DM Area with the Support Software, reset the power supply to the PLC or turn ON the Special I/O Unit Restart Bit. The setting in m+90 in the DM Area will be transferred to the ID Sensor Unit when the power supply turns ON or when the Special I/O Unit Restart Bit is turned ON.

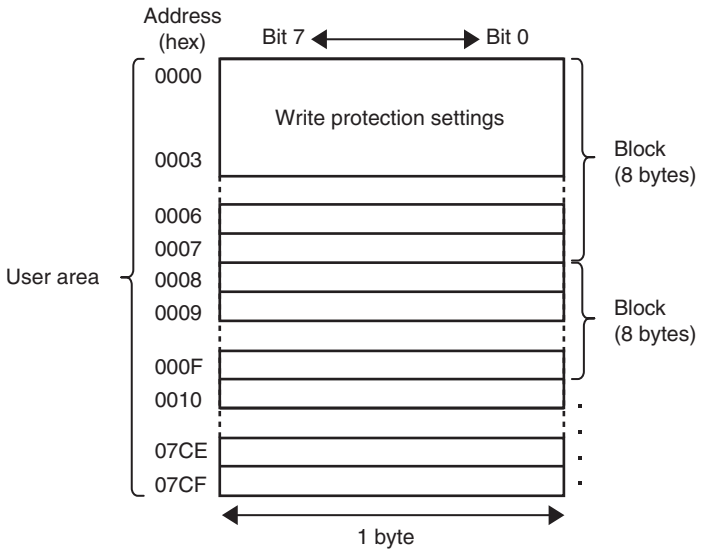
# RF Tag Memory

The memory access area for the ID Sensor Unit is 64 Kbytes from addresses 0000 to FFFF (hex). The area that can actually be accessed is determined by the memory capacity of the RF Tag.

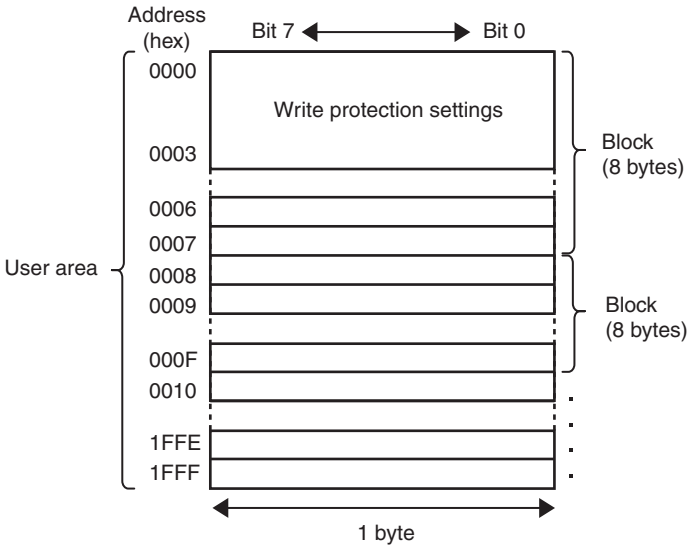
## ■ V680-D1KP□□ RF Tags



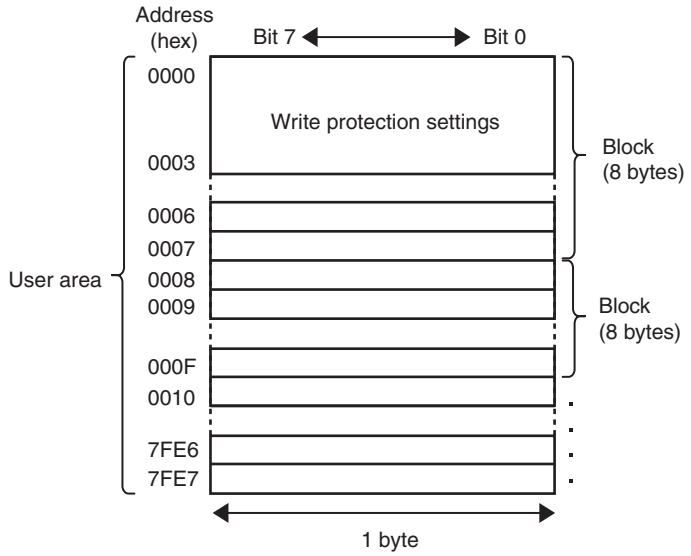

## ■ V680-D2KF□□ RF Tags



## ■ V680-D8KF□□ RF Tags




## ■ V680-D32KF68 RF Tags



# Write Protection

The write protection function is provided so that product model numbers and other important product information stored in the RF Tags can be protected from being lost though careless write operations. We recommend that write protection be set after important data has been written.

CHECK!

Either of two write protection methods can be used, the V680 method or the V600 method. The method can be changed by setting DM m+2 (Write Protection Disable Setting). Normally use the V680 method. If a V600 system is replaced with the V680, the V600 method can be used to enable using the current RF Tag memory map, eliminating the need to change system programming.

## Setting Write Protection Using the V680 Method

Write protection is set in four bytes of RF Tag addresses 0000 to 0003 (hex). The setting for the most significant bit of address 0000 (hex) specifies whether or not write protection is enabled for the RF Tag.

**Write Protection Setting Area in RF Tag Memory Map**

| Address (hex) | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0000 | Enable/ Disable Bit | Upper two digits of start address (00 to 7F) | | | | | | |
| 0001 | Lower two digits of start address (00 to FF) | | | | | | | |
| 0002 | Upper two digits of end address (00 to FF) | | | | | | | |
| 0003 | Lower two digits of end address (00 to FF) | | | | | | | |

- The most significant bit of address 0000 (hex) is the Write-protect Bit.
  ON: Enable write protection
  OFF: Disable write protection
- Write Protection Setting Ranges
  Start address: 0000 to 7FFF hex
  End address: 0000 to FFFF hex

CHECK!

If write protection is enabled, write separately to the write protection setting area (addresses 0000 to 0003 hex) and the rest of the RF Tag (addresses 0004 hex and higher). If the MSB of address 0000 hex is ON and you write both the write protection setting area (addresses 0000 to 0003 hex) and following addresses at the same time, a write protection error will occur.

CHECK!

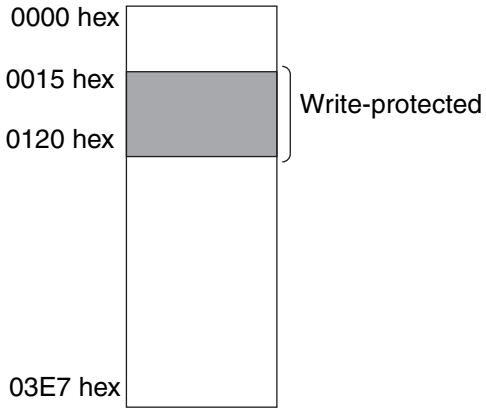
If write protection is disabled, you can use the write protection setting area (addresses 0000 to 0003 hex) as normal user memory. If you use the write protection setting area (addresses 0000 to 0003 hex) as normal user memory, be sure to disable write protection in the ID Sensor Unit.

## • Write Protection Setting Example

### Start Address Lower Than End Address

All addresses from the start address to the end address, inclusive, will be write-protected.

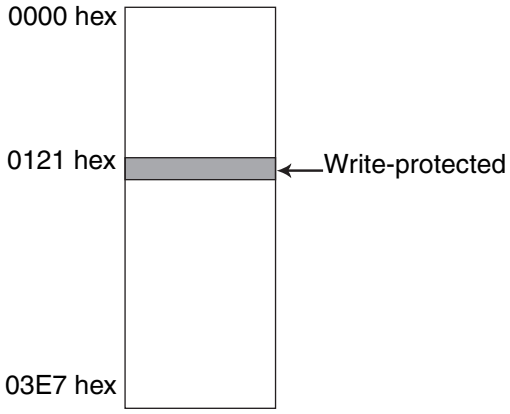
| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8 | | | | 0 | | | |
| 0001 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| | 1 | | | | 5 | | | |
| 0002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 0 | | | | 1 | | | |
| 0003 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | | | | 0 | | | |




### Start Address Equals End Address

Only the set address (1 byte) will be write-protected.

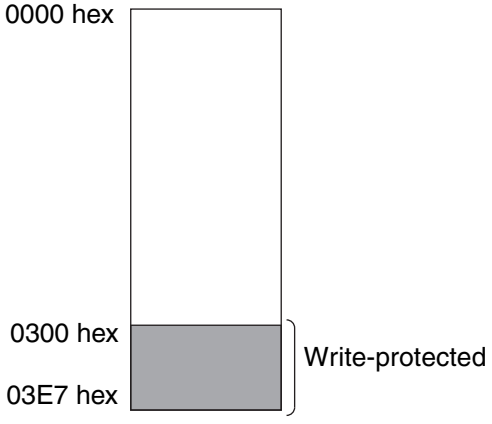
| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 8 | | | | 1 | | | |
| 0001 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | | | | 0 | | | |
| 0002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 0 | | | | 1 | | | |
| 0003 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | | | | 0 | | | |




### End Address Exceeds Last RF Tag Address

All addresses from the start address to the final address in the RF Tag, inclusive, will be write-protected.

| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | 8 | | | | 3 | | | |
| 0001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | | | | 0 | | | |
| 0002 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | 0 | | | | 3 | | | |
| 0003 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | F | | | | F | | | |

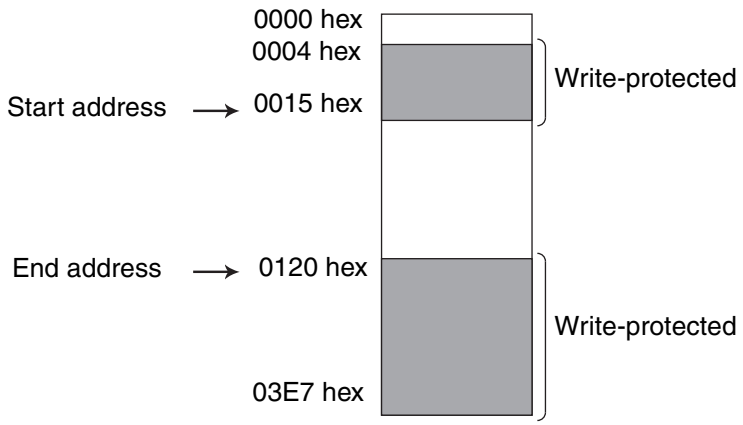



CHECK! The write protection setting area in the RF Tag is not write-protected.

**Start Address Greater Than End Address**

All addresses from the start address to the final address and all addresses from address 0004 hex to the end address in the RF Tag, inclusive, will be write-protected.

| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 8 | | | | 1 | | | |
| 0001 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | | | | 0 | | | |
| 0002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | | | | 0 | | | |
| 0003 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| | 1 | | | | 5 | | | |




CHECK!

The write protection setting area in the RF Tag is not write-protected.

## Clearing Write Protection Using the V680 Method

To temporarily clear write protection, e.g., to overwrite the write-protected data, turn OFF the MSB of address 0000 hex in the RF Tag.

CHECK!

Application Precaution for Write Protection

Write protection is implemented by the ID Sensor Unit. It will not be effective for Reader Writers from other companies.

# Setting Write Protection Using the V600 Method

With the V600 Series, different write protection setting methods are used for EEPROM Data Carriers (V600-D23P□□) (without batteries) and SRAM Data Carriers (with batteries). When using V600 commands with the V680-series ID Sensor Unit, the data memory setting in the ID Sensor Unit and the type of RF Tags can be selected to enable using the previous write protection setting method.

- Using EEPROM RF Tags (V680-D1KP□□)
  V600 EEPROM Write Protection Method
- Using FRAM RF Tags (V680-D2K/8K/32KF□□)
  V600 SRAM Write Protection Method

CHECK!

The ID Sensor Unit will automatically switch between the V600 EEPROM write protection method and the V600 SRAM write protection method. No user setting is required.

## ■ V600 EEPROM Write Protection Method (The following information applies when the V600 write protection method is set and V680-D1KP□□ RF Tags are used.)

Write protection is set by writing the end address to be protected in address 0000 hex of the RF Tag. The area between address 0001 hex and the end address will be write-protected. The status of the most significant bit of address 0000 hex determines whether write protection is enabled.
Therefore, addresses 0080 to 03E7 hex cannot be set as the end address.
If the end address is set to 00 hex, however, all addresses from 0001 to 03E7 hex will be protected.

**Memory Map of Write Protection Setting Area for V600 EEPROM Write Protection Method**

| Address (hex) | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0000 | Enable/ Disable Bit | End address | | | | | | |

- Setting of MSB of Address 0000 Hex
  ON: Write protection enabled
  OFF: Write protection disabled
- End Address Setting Range
  End address: 00 or 01 to 7F hex

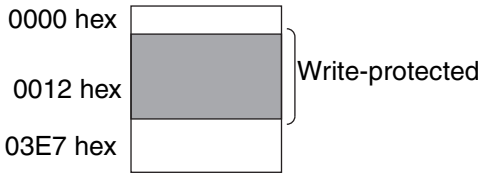
CHECK!

If write protection is enabled, write separately to the write protection setting area (address 0000 hex) and the rest of the RF Tag (addresses 0001 hex and higher). If the MSB of address 0000 hex is ON and you write both the write protection setting area (address 0000 hex) and following addresses at the same time, a write protection error will occur.

**Write Protection Setting Examples**

**The following settings would write-protect addresses 0001 through 0012 hex:**

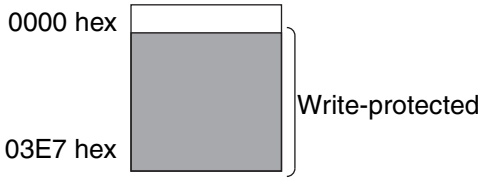
| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8 | | | | 0 | | | |




**End Address Set to 00 Hex**

**The entire memory except address 0000 hex is write-protected by setting the end address to 00 hex, as shown below.**

| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8 | | | | 0 | | | |




CHECK! The write protection setting area in the RF Tag is not write-protected.

## ■ V600 SRAM Write Protection Method

## (The following information applies when the V600 write protection method is set and V680-D2K/8K/32KF□□ RF Tags are used.)

Write protection is set by writing the start address and the end address to be protected in addresses 0002 to 0005 hex of the RF Tag. The area between the start address and the end address will be write-protected. The status of the most significant bit of address 0002 hex determines whether write protection is enabled.

If the V600 SRAM write protection method is being used and write protection is enabled in the ID Sensor Unit, addresses 0000 and 0001 hex will always be write-protected (regardless of the write protection enable/disable setting in the RF Tag).

**Memory Map of Write Protection Setting Area for V600 EEPROM Write Protection Method**

| Address (hex) | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|
| 0002 | Enable/ Disable Bit | Upper two digits of start address (00 to 7F hex) | | | | | | |
| 0003 | Lower two digits of start address (00 to FF hex) | | | | | | | |
| 0004 | Upper two digits of end address (00 to FF hex) | | | | | | | |
| 0005 | Lower two digits of end address (00 to FF hex) | | | | | | | |

- Setting of MSB of Address 0002 Hex
  ON: Write protection enabled
  OFF: Write protection disabled
- Range in RF Tag for Which Write Protection Can Be Set
  Start address: 0006 to 7FFF hex
  End address: 0006 to FFFF hex

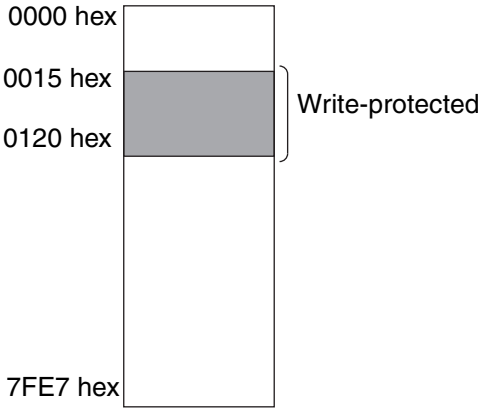
CHECK! If write protection is enabled, write separately to the write protection setting area (addresses 0002 to 0005 hex) and the rest of the RF Tag (addresses 0006 hex and higher). If the MSB of address 0002 hex is ON and you write both the write protection setting area (addresses 0002 to 0005 hex) and following addresses at the same time, a write protection error will occur.

## • RF Tag Write Protection Setting Examples

### Start Address Lower Than End Address

All addresses from the start address to the end address, inclusive, will be write-protected.

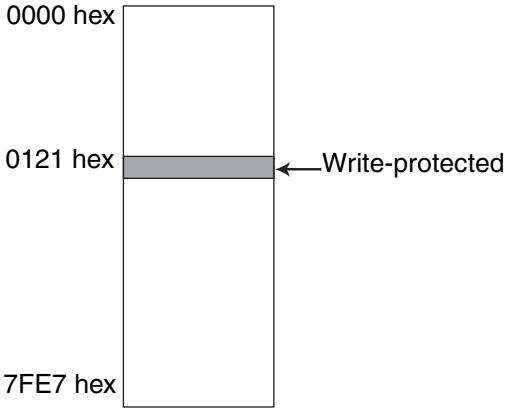
| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8 | | | | 0 | | | |
| 0001 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| | 1 | | | | 5 | | | |
| 0002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 0 | | | | 1 | | | |
| 0003 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | | | | 0 | | | |




### Start Address Equals End Address

Only the set address (1 byte) will be write-protected.

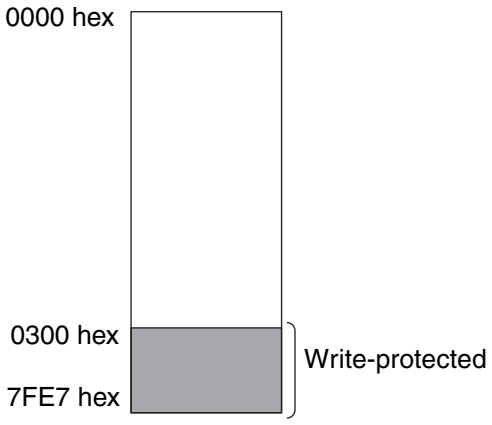
| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 8 | | | | 0 | | | |
| 0001 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | 2 | | | | 1 | | | |
| 0002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | | | | 0 | | | |
| 0003 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| | 2 | | | | 1 | | | |




### End Address Exceeds Last RF Tag Address

All addresses from the start address to the final address in the RF Tag, inclusive, will be write-protected.

| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0000 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| | 8 | | | | 3 | | | |
| 0001 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | | | | 0 | | | |
| 0002 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | F | | | | F | | | |
| 0003 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | F | | | | F | | | |

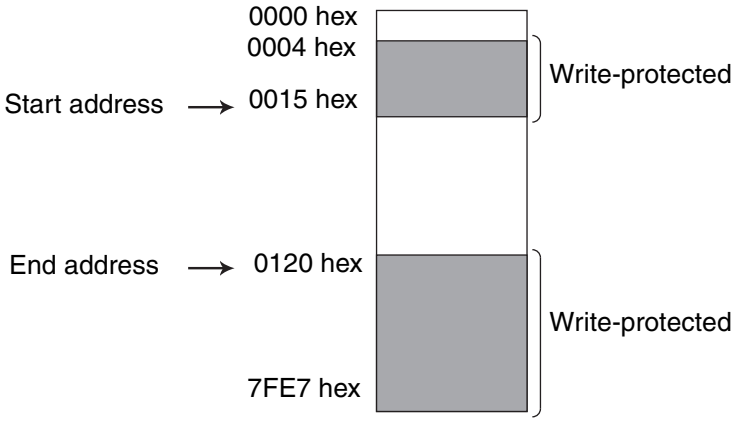



CHECK! The write protection setting area in the RF Tag is not write-protected.
Addresses 0000 and 0001 hex will always be write-protected (regardless of the write protection enable/disable setting in the RF Tag).

**Start Address Greater Than End Address**

All addresses from the start address to the final address and all addresses from address 0006 hex to the end address in the RF Tag, inclusive, will be write-protected.

| Address (hex) | Upper digit | | | | Lower digit | | | |
|---|---|---|---|---|---|---|---|---|
| 0002 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | 8 | | | | 1 | | | |
| 0003 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| | 2 | | | | 0 | | | |
| 0004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 0 | | | | 0 | | | |
| 0005 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 1 |
| | 1 | | | | 5 | | | |




CHECK! The write protection setting area in the RF Tag is not write-protected.
Addresses 0000 and 0001 hex will always be write-protected (regardless of the write protection enable/disable setting in the RF Tag).

## Clearing Write Protection Using the V600 Method

To temporarily clear write protection, e.g., to overwrite the write-protected data, turn OFF the MSB of the following address in the RF Tag.

- V600 EEPROM write protection method: 0000 hex
- V600 SRAM write protection method: 0002 hex
- V680 write protection method: 0000 hex

CHECK! Application Precaution for Write Protection
Write protection is implemented by the ID Sensor Unit. It will not be effective for Reader Writers from other companies.

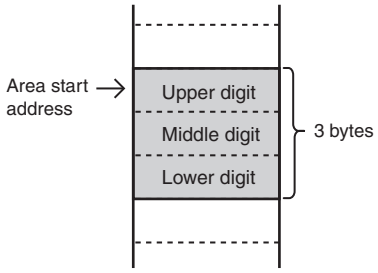
# RF Tag Service Life Check

The Number of Writes Control command can be used to determine whether the RF Tag write limit has been exceeded. Detecting when the write life has been exceeded for an RF Tag is performed by using the Number of Writes Control command that determines whether the write count (100,000 times or a user specified value) for an RF Tag has been exceeded.

There are two ways to manage the number of writes. One is to add to the number of writes and then detect when the total exceeds 100,000 writes. The other is to subtract from a user-specified number of writes and then detect whether the write count has been exceeded.

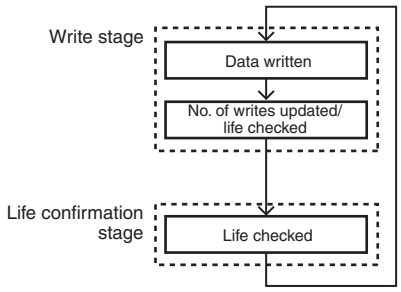
## ■ Number of Writes Control 1 (Life Control = Preset Number of Writes)

The Number of Writes Control Area consists of 3 bytes from the start address. The Number of Writes Control command is executed with an Add specification. The specified numbers of writes are added and the total is written to the control area. When the value in the number of writes control area exceeds the preset number of writes (100,000 writes) (0186A0 hex), the Status Flag (CIO n+8, bit 04) in the Results Information turns ON. If the value in the control area already exceeds 100,000 writes, the value will not be changed.




• Application Method

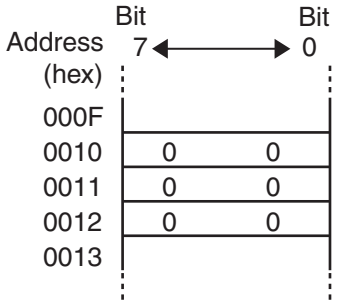
The life of the RF Tag can be managed by updating the number of writes value when data is written to the address most frequently written. (The life of EEPROM RF Tags is 100,000 writes for any one data block (8 bytes), so the number of writes must be counted for the address that is written most frequently.) It is also possible to confirm the number of writes without updating the number of writes value.



## • Application Example

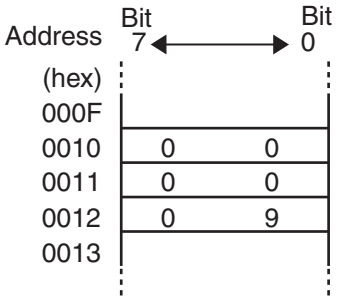
The following example uses 3 bytes starting at address 0010 (hex) as the number of writes control area.

1) A Write command is executed to clear the control area.

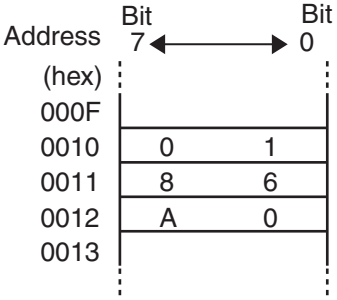



2) The Number of Writes Control command is executed with an Add specification and the number of writes set to 4.

3) The Number of Writes Control command is executed with an Add specification and the number of writes set to 5.




4) The following illustration shows memory status when the total number of writes has reached 100,000 writes. If the Number of Writes Control command is executed with an Add specification and the number of writes set to 5, the Status Flag (CIO n+8, bit 04) in the Results Information will turn ON.

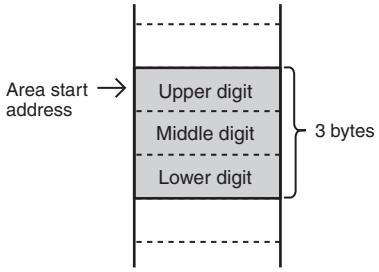



CHECK!

For any one RF Tag, use only an Add specification or a Subtract specification for the Number of Writes Control command. If both specifications are used for the same RF Tag, the number of writes control will not be possible.

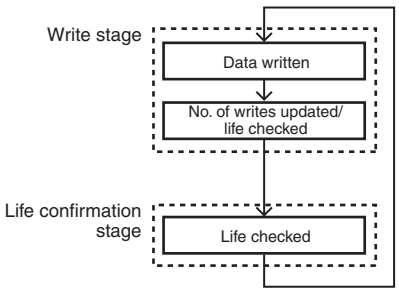
## ■ Number of Writes Control 2 (Life Control = User Setting)

The Number of Writes Control Area consists of 3 bytes from the start address. The Number of Writes Control command is executed with a Subtract specification. The specified number of writes is subtracted and the result is written to the control area. Therefore, to enable control of the number of writes, the maximum number of writes must be written to the Number of Writes Control Area beforehand. The user-specified number of writes can be set to up to 16,700,000. The specified number of writes for EEPROM RF Tags, however, is 100,000 writes (0186A0 hex) at 25°C max., so be sure to set the number of writes to 100,000 or less. When the value in the number of writes control area is less than 0, the Status Flag (CIO n+8, bit 04) in the Results Information turns ON. If the value in the control area is already less than 0, the value will not be changed.




• Application Method

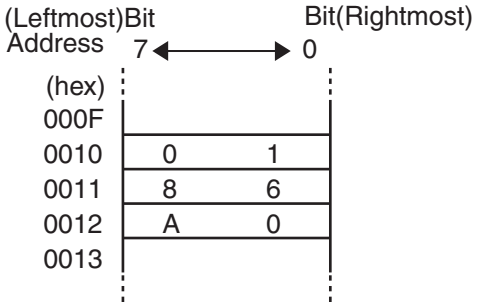
A user-specified number of writes can be used for life control by writing the desired value in the Number of Writes Control Area in advance. The life of the RF Tag can be managed by updating the number of writes value when data is written to the address most frequently written. (The RF Tag has a limited life for any one block of 8 bytes, so the number of writes must be counted for the address that is written most frequently.) It is also possible to confirm the number of writes without updating number of writes value.



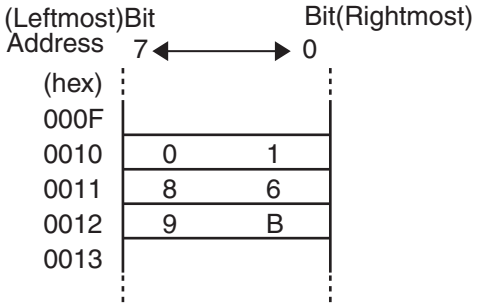
## • Application Example

The following example uses 3 bytes starting at address 0010 (hex) as the number of writes control area.

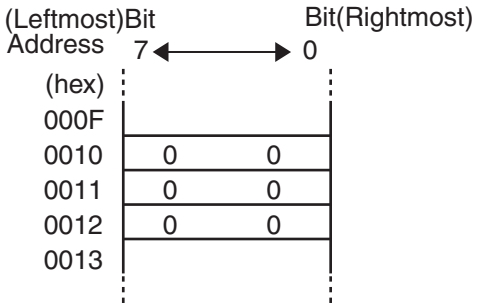
1) A Write command is executed to set the control area to 100,000 writes.




2) The Number of Writes Control command is executed with a Subtract specification and the number of writes set to 5.




3) The following illustration shows memory status when the total number of writes has reached 100,000 writes. If the Number of Writes Control command is executed with a Subtract specification and the number of writes set to 5, the Status Flag (CIO n+8, bit 04) in the Results Information will turn ON.




CHECK!

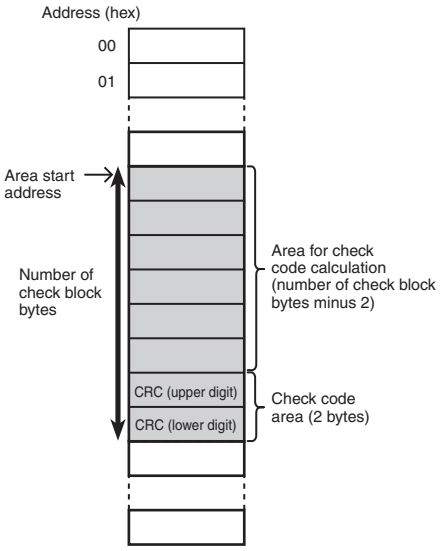
For any one RF Tag, use only an Add specification or a Subtract specification for the Number of Writes Control command. If both specifications are used for the same RF Tag, the number of writes control will not be possible

# RF Tag Memory Check

The Memory Check command performs an RF Tag memory check. A CRC (Cyclic Redundancy Check) code calculation, write, and comparison are made using the check block unit specified by the user. The CRC code is calculated from the generated polynomial expression $X^{16} + X^{12} + X^5 + 1$.

A memory check is performed by using the Data Check command with a Calculation processing specification to write the check code and a Verification processing specification to verify the check code. The start address and the number of bytes determine the specified check block. All but the last 2 bytes are the area to calculate and the last 2 bytes are the check code area.

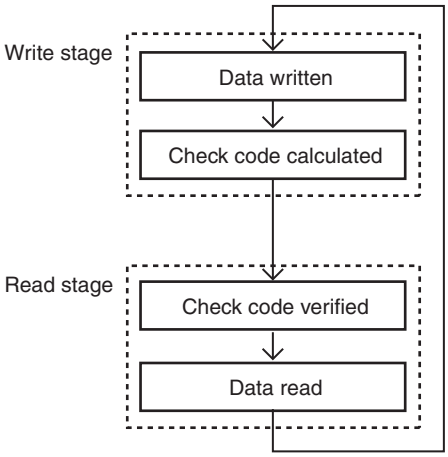
When the Data Check command is executed to write the check code, the CRC code is calculated for the area to calculate and written in the check code area.




When the Data Check command is executed to verify the check code, the CRC code is calculated for the area to calculate and compared with the data in the check code area. If the calculated code is the same as the data in the check code area, the Normal End Flag (CIO n+7, bit 01) in Unit Status will turn ON. If they are not the same, the Error End Flag (CIO n+7, bit 02) in Unit Status will turn ON, and the Status Flag (CIO n+8, bit 04) in the Results Information will turn ON as a warning.

• Application Method

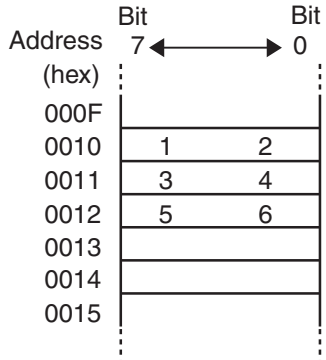
After writing the data, the Data Check command is executed with a Calculation processing specification to calculate and write the check code. Before reading the data, the Data Check command is executed with a Verification processing specification to verify the check code. This enables detecting internal data corruption that might occur in the RF Tag when the data is not being accessed.



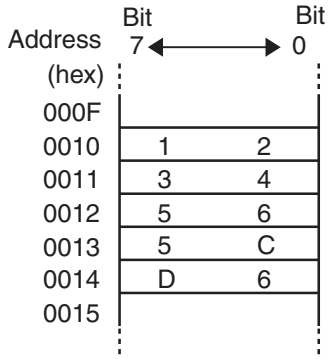
## • Application Example

The following example checks the data in addresses 0010 to 0012 (hex).

1) Assume that the following data is initially in memory.

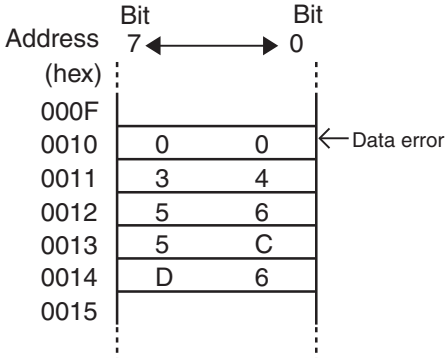



2) The Data Check command is executed to calculate the check code for 5 bytes beginning with address 0010 (hex). The CRC Code 5CD6 hex calculated from the data “123456” is written to addresses 0013 and 0014 (hex).




3) The Data Check command is executed to verify the check code for 5 bytes beginning with address 0010 (hex). If the data is normal, the Normal End Flag in Unit Status (CIO n+7, bit 01) is turned ON.

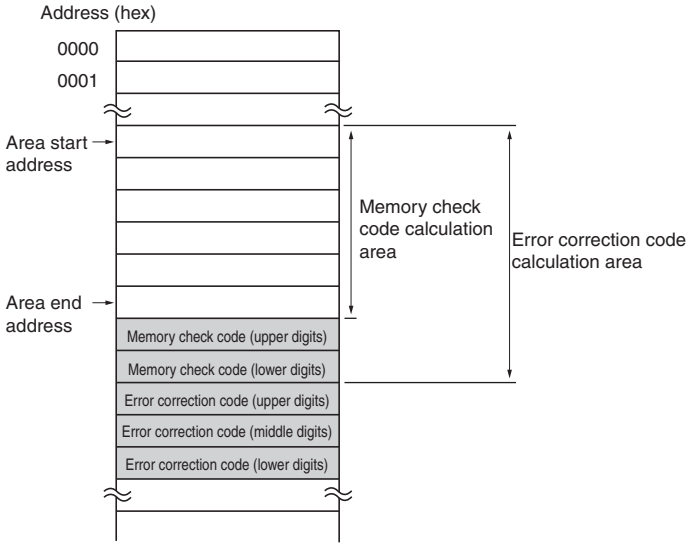
If the check codes are not the same, the Error End Flag (CIO n+7, bit 02) in Unit Status is turned ON.



# RF Tag Memory Error Correction

The Write with Error Correction command can be used to write an RF Tag memory check code and error correction code to the five bytes of memory after the write data. The Read with Error Correction command performs a RF Tag memory check and makes 1-bit memory error corrections.

When a 1-bit memory error is corrected, the Error Correction Flag (CIO n+8, bit 03) in the Results Information will turn ON to warn that a 1-bit memory error occurred, and the normal data with the error corrected will be returned. When a 2-bit or larger memory error is detected, the Status Flag (CIO n+8, bit 04) in the Results Information turn ON to warn that a fatal error occurred, and the read data will not be returned.




## ■ Example of RF Tag Memory Error Correction

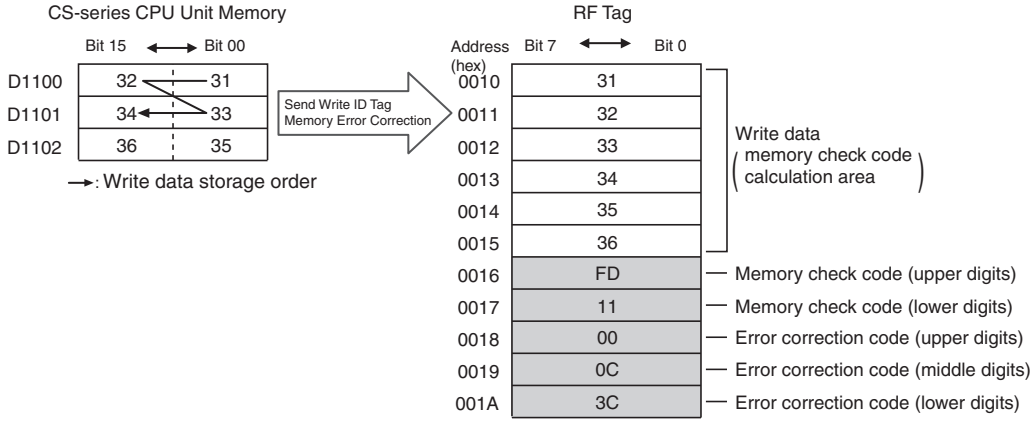
In the following example, the data in addresses 0010 to 0015 (hex) is checked.

1. Send the Write with Error Correction Command.
   - First word allocated to Special I/O Unit in CIO Area: CIO 20000 + 10 x 0 = CIO 20000

| Word address | Contents | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0B 0 0 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 10 | First address to process | | | | | | | | | | | | | | | |
| CIO 2003 | 00 06 | Number of bytes to process | | | | | | | | | | | | | | | |
| CIO 2004 | 11 00 | Data storage location (lower 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 0 00 | Data storage area | | | | Bank designation* (always 0) | | | | Data storage location (upper 2 digits) | | | | | | | |
| CIO 2006 | 00 00 | --- | | | | | | | | | | | | | | | |

*: Always 0 when DM Area is specified, --- : Ignored.

2. Data is written to addresses 0010 to 0015 (hex), then an RF Tag memory check code and a error correction code (5 bytes) are written to addresses 0016 to 001A (hex).




3. Send the Read with Error Correction command.
   • First word allocated to Special I/O Unit in CIO Area: CIO 20000 + 10 x 0 = CIO 20000

| Word address | Contents | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0B 0 0 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 10 | First address to process | | | | | | | | | | | | | | | |
| CIO 2003 | 00 06 | Number of bytes to process | | | | | | | | | | | | | | | |
| CIO 2004 | 11 00 | Data storage location (lower 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 0 00 | Data storage area | | | | | | Bank specification * (always 0) | | Data storage location (upper 2 digits) | | | | | | | |
| CIO 2006 | 00 00 | --- | | | | | | | | | | | | | | | |

*: Always 0 when DM Area is specified, --- : Ignored.

● If the Data Is Normal
The Normal End Flag in Unit Status (CIO n+7, bit 01) turns ON.

● If a Memory Error of 2 Bits or More Is Detected
The Error End Flag in Unit Status (CIO n+7, bit 02) is turned ON, and the Status Flag (CIO n+8, bit 04) in the Results Information is turned ON.

● If a 1-bit Memory Error Is Corrected
The Error End Flag in Unit Status (CIO n+7, bit 02) is turned ON, and the Error Correction Flag (CIO n+8, bit 03) in the Results Information is turned ON as a warning.

MEMO

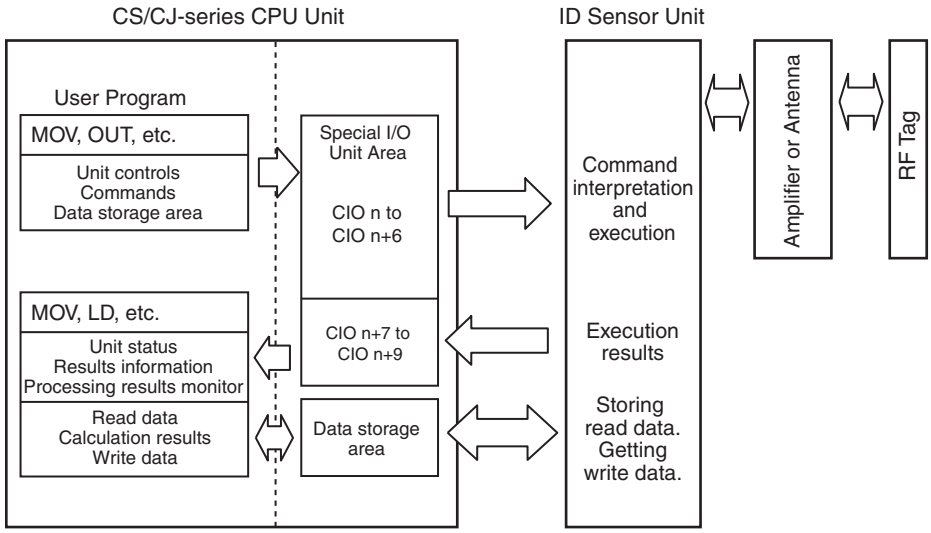
# SECTION 6
# Controlling the ID Sensor Unit


| | |
|---|---|
| ID Sensor Unit Operation | 118 |
| Communications Commands | 125 |
| Communications Time | 141 |

# ID Sensor Unit Operation

The user program in the CS/CJ-series CPU Unit is used to operate the ID Sensor Unit. The ID Sensor Unit performs communications with RF Tags through the Antenna according to data set in the Special I/O Unit Area of the CS/CJ-series CPU Unit.

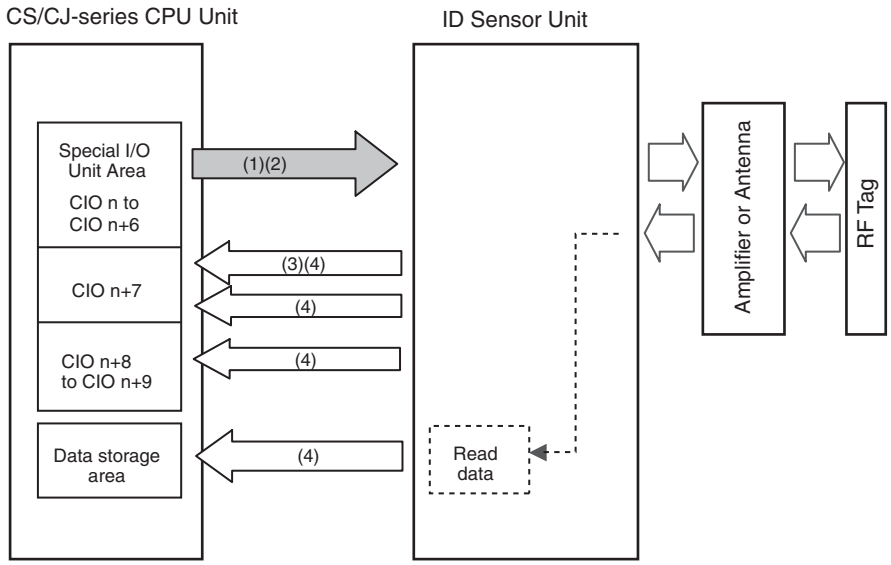
## Outline of Operation




CHECK!

- The ID Sensor Unit will complete execution of any command that is being executed even if the CPU Unit is changed to PROGRAM Mode.
- If an ID Sensor Unit error occurs, communications will stop regardless of the operating mode.
- First word allocated to Unit in CIO Area: n = CIO 2000 + 10 × Unit number

## Commands Used to Read Data (Cyclic Data Transfer for Read, Read with Error Correction, and UID Read)




1) Use the user program to set the processing address, number of processing bytes, data storage word address, and other parameters for reading RF Tag data in the Special I/O Unit Area.

2) Use the user program to turn ON the Command Execution Bit (CIO n, bit 00) in the Special I/O Unit Area.

3) When the ID Sensor Unit detects that the Command Execution Bit has turned ON, it turns ON the ID Busy Flag (CIO n+7, bit 00).

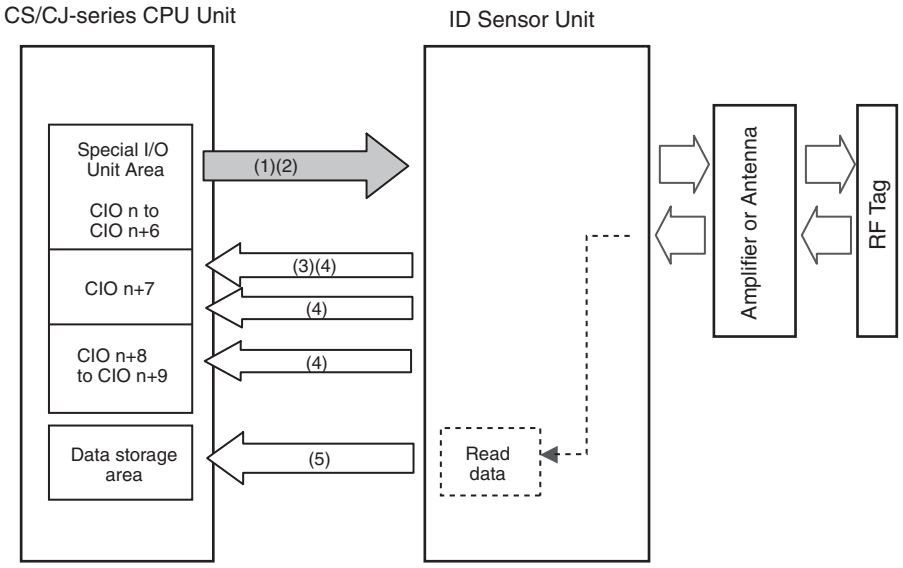
4) The ID Sensor Unit reads the data from the RF Tag, places the Results Information (CIO n+8) and Processing Results Monitor information (word n+9) in the Special I/O Unit Area, places the data read from the RF Tag in the data storage words, turns OFF the ID Busy Flag (CIO n+7, bit 00), and turns ON the Normal End Flag (CIO n+7, bit 01) for one scan.

5) Use the Results Information (CIO n+8), the Processing Results Monitor information (CIO n+9), and the read data stored in the data storage words in the user program only after the Normal End Flag (CIO n+7, bit 01) turns ON. The Results Information (CIO n+8) will be held until the Error Reset Bit (CIO n, bit 01) is turned ON or until the next communications command is received.

CHECK!

• Data is transferred to the data storage words at a rate of 160 bytes per scan.

## Commands Used to Read Data (Intelligent I/O Instruction Data Transfer for Read and Read with Error Correction)




1) Use the user program to set the processing address, number of processing bytes, data storage word address, and other parameters for reading RF Tag data in the Special I/O Unit Area.

2) Use the user program to turn ON the Command Execution Bit (CIO n, bit 00) in the Special I/O Unit Area.

3) When the ID Sensor Unit detects that the Command Execution Bit has turned ON, it turns ON the ID Busy Flag (CIO n+7, bit 00).

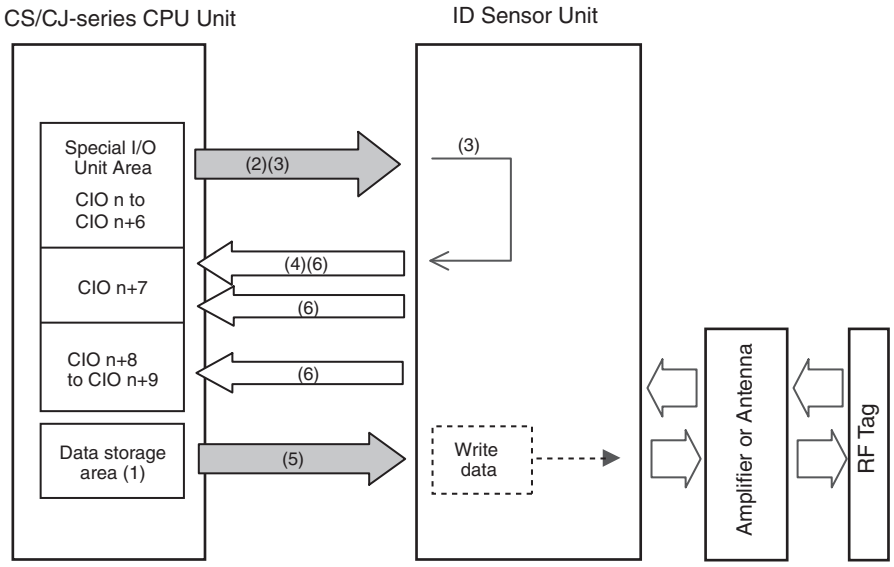
4) The ID Sensor Unit reads the data from the RF Tag, places the Results Information (CIO n+8) and Processing Results Monitor information (word n+9) in the Special I/O Unit Area, turns OFF the ID Busy Flag (CIO n+7, bit 00), and turns ON the Normal End Flag (CIO n+7, bit 01) for one scan.

5) Use the IORD instruction in the user program to transfer the read data to the data storage words after the Normal End Flag (CIO n+7, bit 01) turns ON. Then use the Results Information (CIO n+8), the Processing Results Monitor information (CIO n+9), and the read data.
The Results Information (CIO n+8) will be held until the Error Reset Bit (CIO n, bit 01) is turned ON or until the next communications command is received.

CHECK!

• By using the IORD instruction, up to 2,048 bytes of data can be transferred in one scan.

## Commands Used to Write Data (Cyclic Data Transfer for Write, Bit Set, Bit Clear, Mask Bit Write, Calculation Write, Data Fill, Data Check, Number of Writes Control, and Write with Error Correction)




1) Use the user program to set the write data in the data storage area.

2) Use the user program to set the processing address, number of processing bytes, data storage word address, and other parameters for writing RF Tag data in the Special I/O Unit Area.

3) Use the user program to turn ON the Command Execution Bit (CIO n, bit 00) in the Special I/O Unit Area.

4) When the ID Sensor Unit detects that the Command Execution Bit has turned ON, it turns ON the ID Busy Flag (CIO n+7, bit 00).

5) The ID Sensor Unit reads the write data from the data storage words to internal memory and then writes the data to the RF Tag.

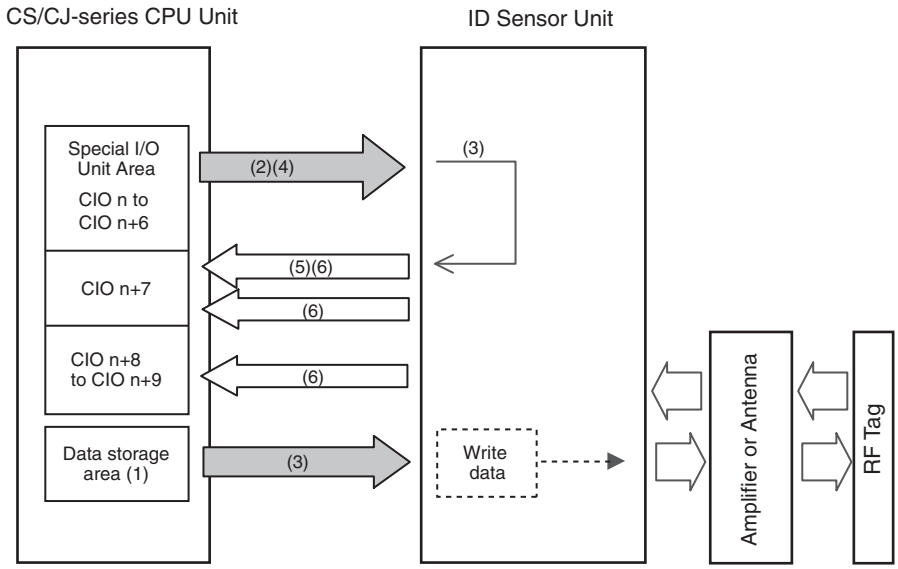
6) The ID Sensor Unit writes the data to the RF Tag, places the Results Information (CIO n+8) and Processing Results Monitor information (word n+9) in the Special I/O Unit Area, turns OFF the ID Busy Flag (CIO n+7, bit 00), and turns ON the Normal End Flag (CIO n+7, bit 01) for one scan.

The Results Information (CIO n+8) will be held until the Error Reset Bit (CIO n, bit 01) is turned ON or until the next communications command is received.

CHECK!

- Data is transferred to the data storage words at a rate of 160 bytes per scan.

## Commands Used to Write Data (Intelligent I/O Instruction Data Transfer for Write and Write with Error Correction)




1) Use the user program to set the write data in the data storage area.

2) Use the user program to set the processing address, number of processing bytes, data storage word address, and other parameters for writing RF Tag data in the Special I/O Unit Area.

3) Use the IOWR instruction in the user program to transfer the write data in the data storage words to the ID Sensor Unit.

4) Use the user program to turn ON the Command Execution Bit (CIO n, bit 00) in the Special I/O Unit Area.

5) When the ID Sensor Unit detects that the Command Execution Bit has turned ON, it turns ON the ID Busy Flag (CIO n+7, bit 00).

6) The ID Sensor Unit writes the data to the RF Tag, places the Results Information (CIO n+8) and Processing Results Monitor information (word n+9) in the Special I/O Unit Area, turns OFF the ID Busy Flag (CIO n+7, bit 00), and turns ON the Normal End Flag (CIO n+7, bit 01) for one scan.

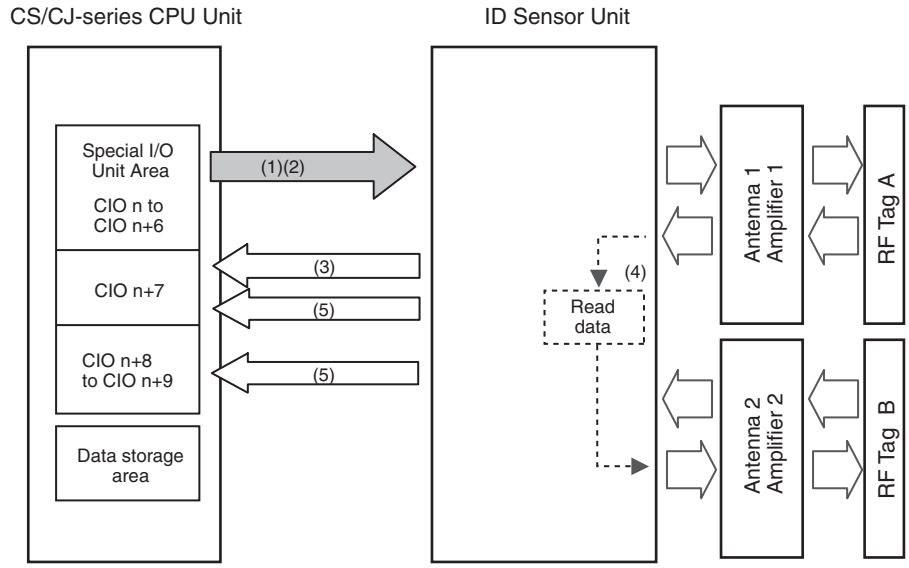
The Results Information (CIO n+8) will be held until the Error Reset Bit (CIO n, bit 01) is turned ON or until the next communications command is received.

CHECK!

- By using the IOWR instruction, up to 2,048 bytes of data can be transferred in one scan.

## Copy Command

The following example shows writing the data from RF Tag A for Antenna 1 to RF Tag B for Antenna 2.




1) Use the user program to set the processing address, number of processing bytes, data storage word address, and other parameters for copying RF Tag data in the Special I/O Unit Area.

2) Use the user program to turn ON the Command Execution Bit (CIO n, bit 00) in the Special I/O Unit Area.

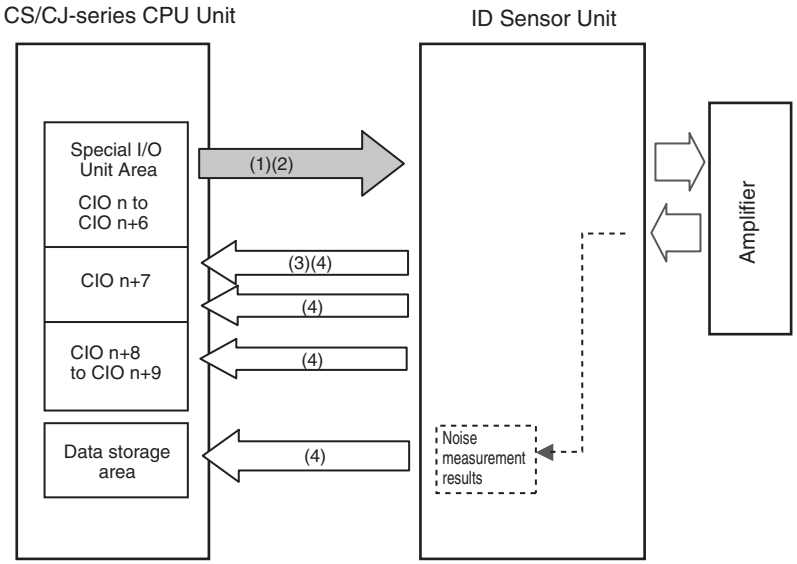
3) When the ID Sensor Unit detects that the Command Execution Bit has turned ON, it turns ON the ID Busy Flag (CIO n+7, bit 00).

4) The ID Sensor Unit will read data from RF Tag A and write it to RF Tag B.

5) The ID Sensor Unit writes the data to the RF Tag, places the Results Information (CIO n+8) and Processing Results Monitor information (word n+9) in the Special I/O Unit Area, turns OFF the ID Busy Flag (CIO n+7, bit 00), and turns ON the Normal End Flag (CIO n+7, bit 01) for one scan.

The Results Information (CIO n+8) will be held until the Error Reset Bit (CIO n, bit 01) is turned ON or until the next communications command is received.

## Noise Measurement Command




1) Use the user program to set the storage words for noise measurement data and other parameters in the Special I/O Unit Area.

2) Use the user program to turn ON the Command Execution Bit (CIO n, bit 00) in the Special I/O Unit Area.

3) When the ID Sensor Unit detects that the Command Execution Bit has turned ON, it turns ON the ID Busy Flag (CIO n+7, bit 00).

4) The ID Sensor Unit measures the noise around the Antenna, places the Results Information (CIO n+8) and Processing Results Monitor information (word n+9) in the Special I/O Unit Area, places the noise measurement results in the data storage words, turns OFF the ID Busy Flag (CIO n+7, bit 00), and turns ON the Normal End Flag (CIO n+7, bit 01) for one scan.

5) Use the Results Information (CIO n+8), the Processing Results Monitor information (CIO n+9), and noise measurement results in the data storage words in the user program only after the Normal End Flag (CIO n+7, bit 01) turns ON.

# Communications Commands

## Commands

| Command name | Command code | Function |
|---|---|---|
| Read | 00 | Reads data from the RF Tag's memory. |
| Write | 01 | Writes data to the RF Tag's memory. |
| Bit Set | 02 | Sets the specified bits of the specified area in the RF Tag. |
| Bit Clear | 03 | Clears the specified bits of the specified area in the RF Tag. |
| Mask Bit Write | 04 | Masks the specified bits in the specified area of the RF Tag and writes data to the bits that are not masked. |
| Calculation Write | 05 | Writes the calculation result between memory data and the specified data to the RF Tag. |
| Data Fill | 06 | Writes the specified data to the specified area of the RF Tag. |
| Data Check | 07 | Calculates and verifies check codes for RF Tag memory. |
| Number of Writes Control | 08 | Controls RF Tag write life. |
| Copy | 09 | Writes the data read from an RF Tag by one Antenna to the RF Tag for the other Antenna.<br>This command is supported by Two-channels ID Sensor Units only. |
| Read with Error Correction | 0A | Reads data from the RF Tag's memory.<br>Also uses a memory check code to check data reliability. |
| Write with Error Correction | 0B | Writes data to the RF Tag's memory.<br>Also writes the memory check code for the data reliability checking to the memory of the RF Tag. |
| UID Read | 0C | Reads the RF Tag's ID code. |
| Noise Measurement | 10 | Measures the noise and returns the noise level as the measurement result. |

CHECK!

- The Data Fill command will write data to the user area in the RF Tag regardless of the setting of write protection
- If there is an error in the command or option specifications, the Command Error Flag (CIO n+8, bit 00) in the Results Information will turn ON and the command will not be executed.

# Command Descriptions

## ■ Read

Reads the specified number of bytes from the specified start address in the RF Tag.
Up to 2,048 bytes (i.e., 1,024 words) can be read with one command execution.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command Code | 00 hex |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag. |
| | | | | | 0: Trigger |
| | | | | | 1: Single Auto |
| | | | | | 2: Repeat Auto |
| | | | | | 3: FIFO trigger |
| | | | | | 4: FIFO repeat |
| | | | | | 5: Multi-access trigger |
| | | | | | 6: Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the read data storage order. |
| | | | | | 0: Leftmost → Rightmost |
| | | | | | 1: Rightmost → Leftmost |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to read, Setting range: 0000 to FFFF hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify the number of RF Tag read bytes. Setting range: 0001 to 0800 hex |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the read data storage destination. p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Not used |

CHECK!

- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tags for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ Write

Writes the specified number of bytes of data beginning at the specified start address in the RF Tag. Up to 2,048 bytes (i.e., 1,024 words) can be written with one command execution.

| Word address | | Bit No. | Type | Bit name | Description | |
|---|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 01 hex | |
| | | 04 t 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag. | |
| | | | | | 0 | Trigger |
| | | | | | 1 | Single auto |
| | | | | | 2 | Repeat auto |
| | | | | | 3 | FIFO trigger |
| | | | | | 4 | FIFO repeat |
| | | | | | 5 | Multi-access trigger |
| | | | | | 6 | Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the write data storage order. | |
| | | | | | 0 | Leftmost → Rightmost |
| | | | | | 1 | Rightmost → Leftmost |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to write. Setting range: 0000 to FFFF hex | |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify number of RF Tag write bytes Setting range: 0001 to 0800 hex | |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the write data storage destination. p. 70 | |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | | |
| | | 08 to 11 | | Bank Specification | | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Not used. | |

CHECK!

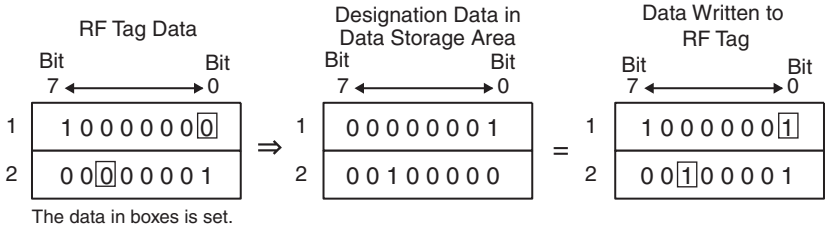
- Verification will not be performed if No Verification is set for writing.

CHECK!

- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tags for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ Bit Set

Reads the specified number of bytes from the specified start address and sets the specified bits to 1.
For the Designation Data, set a hexadecimal value with the bits to be set to 1 turned ON.
Up to 4 bytes (i.e., 2 words) can be specified for one command execution.
The following example shows specifying 0120 hex for 2 bytes of data to set bit 0 in byte 1 and bit 5 in byte 2.


RF Tag Data
Bit 7 ← → Bit 0
1 1 0 0 0 0 0 0 [0]
2 0 0 [0] 0 0 0 0 1
⇒
Designation Data in Data Storage Area
Bit 7 ← → Bit 0
1 0 0 0 0 0 0 0 1
2 0 0 1 0 0 0 0 0
=
Data Written to RF Tag
Bit 7 ← → Bit 0
1 1 0 0 0 0 0 0 [1]
2 0 0 [1] 0 0 0 0 1
The data in boxes is set.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command | 02 hex |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag. |
| | | | | | 0 Trigger |
| | | | | | 1 Single auto |
| | | | | | 2 Repeat auto |
| | | | | | 3 FIFO trigger |
| | | | | | 4 FIFO repeat |
| | | | | | 5 Multi-access trigger |
| | | | | | 6 Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the storage order for the Designation Data. |
| | | | | | 0 Leftmost → Rightmost |
| | | | | | 1 Rightmost → Leftmost |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to write. Setting range: 0000 to FFFF hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify number of RF Tag bytes to write. Setting range: 0001 to 0004 hex |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the write data storage destination. p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Not used |

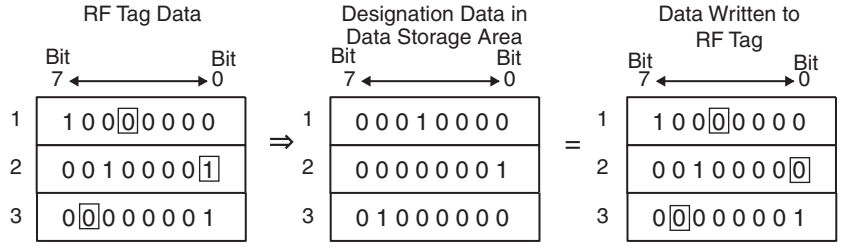
CHECK!
- Data status will not be changed for any bit that is OFF in the Designation Data.
- Verification will not be performed if No Verification is set for writing.

CHECK!
- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ Bit Clear

Reads the specified number of bytes from the specified start address and clears the specified bits to 0. For the Designation Data, set a hexadecimal value with the bits to be cleared to 0 turned ON. Up to 4 bytes (i.e., 2 words) can be specified for one command execution.

The following example shows specifying 100140 hex for 3 bytes of data to clear bit 4 in byte 1, bit 0 in byte 2, and bit 6 in byte 3.




The data in boxes is cleared.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 03 hex |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag. |
| | | | | | 0 Trigger |
| | | | | | 1 Single auto |
| | | | | | 2 Repeat auto |
| | | | | | 3 FIFO trigger |
| | | | | | 4 FIFO repeat |
| | | | | | 5 Multi-access trigger |
| | | | | | 6 Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the storage order for the Designation Data. |
| | | | | | 0 Leftmost → Rightmost |
| | | | | | 1 Rightmost → Leftmost |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to write. Setting range: 0000 to FFFF hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify number of RF Tag bytes to write. Setting range: 0001 to 0004 hex |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the write data storage destination. p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Not used |

CHECK!

- Data status will not be changed for any bit that is OFF in the Designation Data.
- Verification will not be performed if No Verification is set for writing.

CHECK!

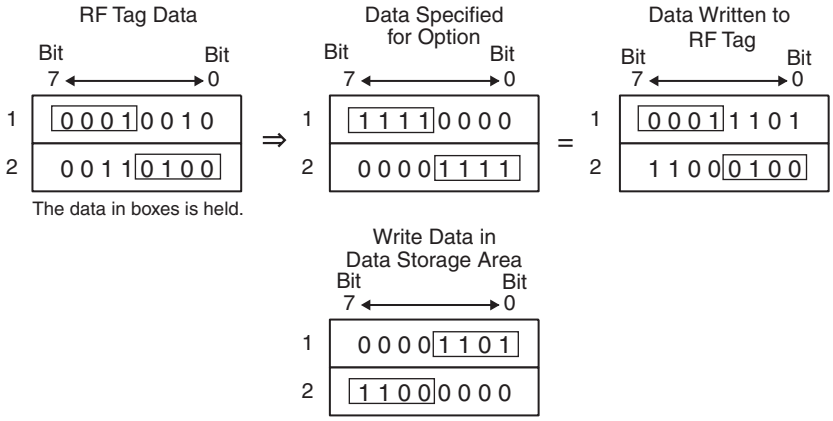
- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ Mask Bit Write

Reads the 2 bytes of data from the specified start address, masks it with the specified mask data, and writes data to the bits that are not masked. For the mask data, set a hexadecimal value with the bits to be masked turned ON.

Each command execution processes 2 bytes (i.e., 1 word).

Example for a Masked Bit Write




| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| **Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12** | **Antenna 2 of CS1W-V680C12 or CJ1W-V680C12** | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 04 hex |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag.<br>0: Trigger<br>1: Single auto<br>2: Repeat auto<br>3: FIFO trigger<br>4: FIFO repeat<br>5: Multi-access trigger<br>6: Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the write data storage order.<br>0: Leftmost → Rightmost<br>1: Rightmost → Leftmost |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to write.<br>Setting range: 0000 to FFFE hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Not used |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the write data storage destination. p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Mask data (0000 to FFFE hex) |

CHECK!

- The bits that are turned ON in the data set for the Command Option will be masked and will not be changed. Write data will be written to the data storage area for bits that are OFF in the write data.
- Verification will not be performed if No Verification is set for writing.

CHECK!

- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

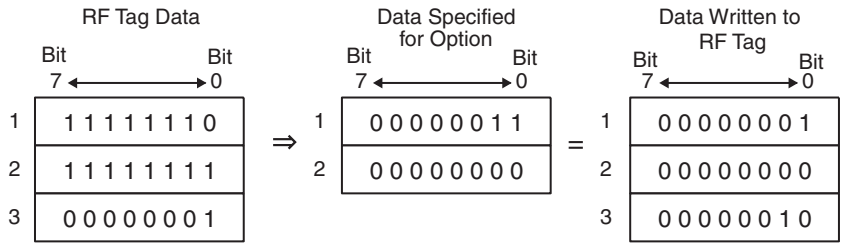
CHECK!

- The mask data is always specified leftmost to rightmost regardless of the processing specification.

## ■ Calculation Write

Reads the specified number of bytes from the specified start address, performs the specified calculation with the data specified for the Command Option, and writes the result.
The calculation result is stored in the data storage area.
Up to 4 bytes (i.e., 2 words) can be specified for one command execution.

Example for Additions




| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| **Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12** | **Antenna 2 of CS1W-V680C12 or CJ1W-V680C12** | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 05 hex |
| | | 07 to 04 | | Communications Specification p. 85 | Specify the communications method with the RF Tag.<br>0 Trigger<br>1 Single auto<br>2 Repeat auto<br>3 FIFO trigger<br>4 FIFO repeat<br>5 Multi-access trigger<br>6 Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the calculation method.<br>0 Add<br>1 Subtract |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to write.<br>Setting range: 0000 to FFFF hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify number of RF Tag write bytes.<br>Setting range: 0001 to 0004 hex |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the calculation result storage area. p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Calculation data |

CHECK!
- If an addition results in an overflow or a subtraction results in an underflow, the Status Flag (CIO n+8, bit 04) will turn ON and the number of writes data will not be changed.
- Verification will not be performed if No Verification is set for writing.

CHECK!
- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ Data Fill

Writes the designated fill data to the RF Tag beginning from the specified start address.
The maximum amount of data that can be written in a single execution is 2,048 bytes (1,024 words), or to the entire remaining area after the specified start address.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 06 hex |
| | | 04 o 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag. |
| | | | | | 0 Trigger |
| | | | | | 1 Single auto |
| | | | | | 2 Repeat auto |
| | | | | | 3 FIFO trigger |
| | | | | | 4 FIFO repeat |
| | | | | | 5 Multi-access trigger |
| | | | | | 6 Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the fill data size. |
| | | | | | 0 Bytes (Command option rightmost 8 bits) |
| | | | | | 1 Words |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to write. Setting range: 0000 to FFFF hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify number of RF Tag write bytes Setting range: 0000, 0001 to 0800 hex 0000 hex: Fill data is written to the RF Tag's end address. |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Not used |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Fill data Setting range: 0000 to FFFF hex |

CHECK!

- If the Number of Processing Bytes is 0000 hex, data will be written to user area of the RF Tag from the start address to the end address.
- The Data Fill command will write data to the user area in the RF Tag regardless of the setting of write protection.
- Verification will not be performed if No Verification is set for writing.

CHECK!

- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ Data Check

Finds the CRC code for the data area from the specified start address to 2 bytes less than the specified number of bytes and writes 2 bytes of data.

From 3 to 2,048 bytes of data can be specified for one command execution.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 07 hex |
| | | 04 to 07 | | Communications specification p. 85 | Specify the communications method with the RF Tag. |
| | | | | | 0 Trigger |
| | | | | | 1 Single auto |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the process. |
| | | | | | 0 CRC calculation |
| | | | | | 1 CRC verification |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the Data Check Start address in the RF Tag. Setting range: 0000 to FFFD hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify the number of bytes in the data check range in the RF Tag plus 2 bytes. Setting range: 0003 to 0800 hex |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | No used |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | No used |

CHECK!

- Verification will not be performed if No Verification is set for writing.

CHECK!

- The last 2 bytes of the check area is the check code area. Do not write user data to these bytes.
- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, RF Tag Address Error (CIO n+8, bit 13) will turn ON.

## ■ Number of Writes Control

Uses 3 bytes of data from the specified start address as the Number of Writes Control Area and writes data to the RF Tag.

The number of writes for one command execution can be from 0 to 255.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 08 hex |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag. |
| | | | | | 0: Trigger |
| | | | | | 1: Single auto |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the count update method. |
| | | | | | 0: Add |
| | | | | | 1: Subtract |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the start address of the Number of Writes Control Area in the RF Tag. Setting range: 0000to FFFD hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Not used |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the count update results storage area. p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Number of writes Setting range: 0000 to 00FF hex |

CHECK!

- Verification will not be performed if No Verification is set for writing.

CHECK!

- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ Copy (Two-channels ID Sensor Units Only)

This command is supported by Two-channels ID Sensor Units only. Data is read from the RF Tag for one Antenna and written to the memory of an RF Tag in the communications area for the other Antenna.

Writing to the second RF Tag is always performed with a trigger

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C12 or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 09 hex |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method for the RF Tag to be read. |
| | | | | | 0 Trigger |
| | | | | | 1 Single auto |
| | | 00 to 03 | | Processing Specification p. 70 | Not used |
| n+2 | n+12 | 00 to 15 | --- | Processing Address | Specify the first RF Tag address to read. Setting range: 0000 to FFFF hex |
| n+3 | n+13 | 00 to 15 | --- | Number of Processing Bytes | Specify the number of RF Tag read bytes Setting range: 0001 to 0800 hex |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Not used |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Specify the first RF Tag address to write. Setting range: 0000 to FFFF hex |

CHECK!

- If the Command Execution Bit is turned ON in the Unit Controls for Antenna 1, data will be read from the RF Tag for Antenna 1 and written to the RF Tag for Antenna 2.
- If the Command Execution Bit is turned ON in the Unit Controls for Antenna 2, data will be read from the RF Tag for Antenna 2 and written to the RF Tag for Antenna 1.
- The Communications Specification for the Antenna that writes data will always be a trigger regardless of the specified communications method.
- The Status Flag (CIO n+8, bit 04) in the Results Information will turn ON if an error occurs in the Antenna that writes data.

CHECK!

- Confirm that the Antenna that writes data is not communicating before turning ON the Command Execution Bit. If the Antenna that writes data is communicating, the Status Flag (CIO n+8, bit 04) in the Results Information will turn ON.
- Confirm the capacity of both the RF Tag being read and the one being written before using this command. If the Processing Address and Number of Processing Bytes for the Antenna that write data are not suitable for the RF Tag being communicated with, the Status Flag (CIO n+8, bit 04) in the Results Information will turn ON.

## ■ Read with Error Correction

Reads the data from the RF Tag from an area written by the Write with Error Correction Command, and performs an error check and 1-bit error correction.

Up to 510 bytes (i.e., 255 words) can be specified for one command execution.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 0A hex |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag. |
| | | | | | 0 Trigger |
| | | | | | 1 Single auto |
| | | | | | 2 Repeat auto |
| | | | | | 3 FIFO trigger |
| | | | | | 4 FIFO repeat |
| | | | | | 5 Multi-access trigger |
| | | | | | 6 Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the read data storage order. |
| | | | | | 0 Leftmost → Rightmost |
| | | | | | 1 Rightmost → Leftmost |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to read. Setting range: 0000 to FFFA hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify the number of RF Tag read bytes. Setting range: 0001 to 01FE hex |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the read data storage destination. p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | No used |

CHECK!

- Be sure to read the same area that was written by the Write with Error Correction Command.

CHECK!

- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

CHECK!

- The five bytes of data after the area extending from the Processing Address for the Number of Processing Bytes is the check code area. Do not write any data to the check code area.
- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ Write with Error Correction

Writes the designated data to the RF Tag beginning from the specified start address, and writes the RF Tag memory check code and error correction code to the next 5 bytes of memory. Do not change this code. It is required by the Read with Error Correction command.

Up to 510 bytes (i.e., 255 words) can be specified for one command execution.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 0B hex |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag.<br>0: Trigger<br>1: Single auto<br>2: Repeat auto<br>3: FIFO trigger<br>4: FIFO repeat<br>5: Multi-access trigger<br>6: Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the write data storage order.<br>0: Leftmost → Rightmost<br>1: Rightmost → Leftmost |
| n+2 | n+12 | 00 to 15 | | Processing Address | Specify the first RF Tag address to write. Setting range: 0000 to FFFA hex |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | Specify the number of RF Tag write bytes. Setting range: 0001 to 01FE hex |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the write data storage destination p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Not used |

CHECK!

- Verification will not be performed if No Verification is set for writing.

CHECK!

- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

CHECK!

- The five bytes of data after the area extending from the Processing Bytes is the check code area. Do not write any data to the check code area.
- Check the memory capacity of the RF Tag before setting the Processing Address and Number of Processing Bytes. If the Processing Address and Number of Processing Bytes are not suitable for the RF Tag for which communications are being performed, the RF Tag Address Error Flag (CIO n+8, bit 13) will turn ON.

## ■ UID Read

Reads the ID code from the RF Tag.

| Word address | | Bit No. | Type | Bit name | Description | |
|---|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 0C hex | |
| | | 04 to 07 | | Communications Specification p. 85 | Specify the communications method with the RF Tag. | |
| | | | | | 0 | Trigger |
| | | | | | 1 | Single auto |
| | | | | | 2 | Repeat auto |
| | | | | | 3 | FIFO trigger |
| | | | | | 4 | FIFO repeat |
| | | | | | 5 | Multi-access trigger |
| | | | | | 6 | Multi-access repeat |
| | | 00 to 03 | | Processing Specification p. 70 | Specify the read data storage order. | |
| | | | | | 0 | Leftmost → Rightmost |
| | | | | | 1 | Rightmost → Leftmost |
| n+2 | n+12 | 00 to 15 | | Processing Address | Not used | |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | | |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the read data storage destination. p. 70 | |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | | |
| | | 08 to 11 | | Bank Specification | | |
| | | 07 to 11 | | Data Storage Word Address (leftmost 2 digits) | | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Not used | |

## ■ Noise Measurement

Checks the noise level when the command is received.

| Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V680C11, CS1W-V680C12, CJ1W-V680C11, or CJ1W-V680C12 | Antenna 2 of CS1W-V680C12 or CJ1W-V680C12 | | | | |
| n+1 | n+11 | 08 to 15 | Command | Command code | 10 hex |
| | | 04 to 07 | | Communications Specification p. 85 | Not used |
| | | 00 to 03 | | Processing Specification | Not used |
| n+2 | n+12 | 00 to 15 | | Processing Address | |
| n+3 | n+13 | 00 to 15 | | Number of Processing Bytes | |
| n+4 | n+14 | 00 to 15 | Data storage area | Data Storage Word Address (rightmost 4 digits) | Specify the data storage destination. p. 70 |
| n+5 | n+15 | 12 to 15 | | Data Storage Area | |
| | | 08 to 11 | | Bank Specification | |
| | | 00 to 07 | | Data Storage Word Address (leftmost 2 digits) | |
| n+6 | n+16 | 00 to 15 | Option | Command Option | Not used |

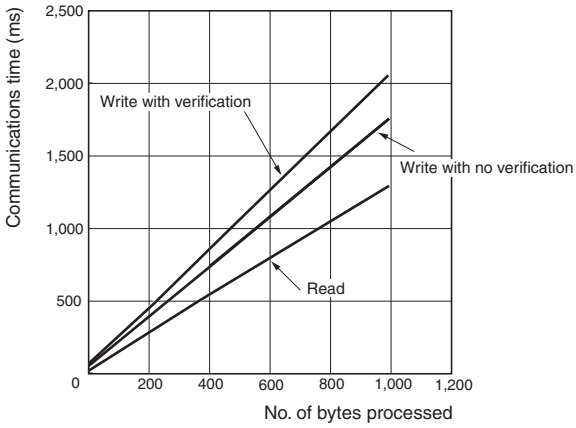
# Communications Time

## RF Tag Communications Time

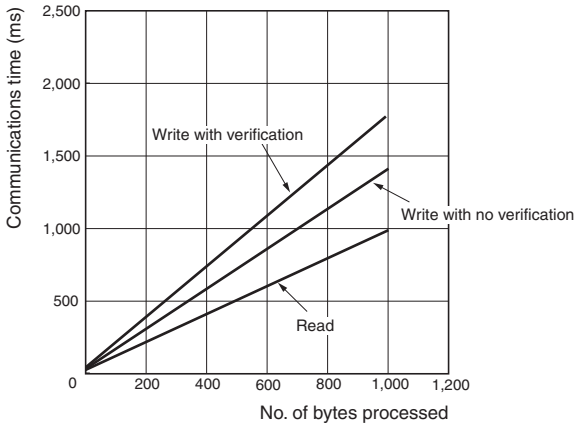
**V680-HA63A, V680-HS□□, V680-D1KP□□, V680-H01-V2, and V680-D1KP□□**

| RF Tag communications speed | Command | Communications time<br>N: Number of processed bytes |
|---|---|---|
| Normal Mode | Read | T = 1.3N + 31 |
| | Write with verification | T = 2.1N + 58 |
| | Write with no verification | T = 1.8N + 56 |
| High-speed Mode | Read | T = 1.0N + 29 |
| | Write with verification | T = 1.8N + 51 |
| | Write with no verification | T = 1.5N + 47 |

● Communications speed: Normal Mode




● Communications speed: High-speed Mode

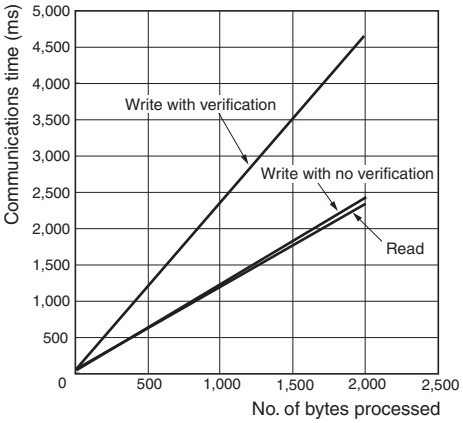



**V680-HA63B, V680-HS□□, and V680-D2KF□□**

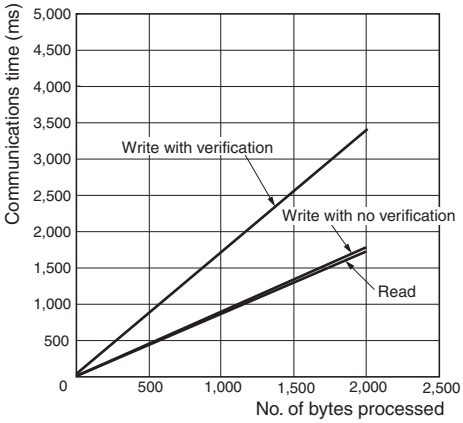
| RF Tag communications speed | Command | Communications time<br>N: Number of processed bytes |
|---|---|---|
| Normal Mode | Read | T = 1.2N + 30 |
| | Write with verification | T = 2.4N + 49 |
| | Write with no verification | T = 1.2N + 49 |
| High-speed Mode (See note.) | Read | T = 0.9N + 27 |
| | Write with verification | T = 1.7N + 49 |
| | Write with no verification | T = 0.9N + 41 |

**Note:** When using a multi-access or FIFO communications specification, the Normal Mode communications speed will be used even if the High-speed Mode is set.

● Communications speed: Normal Mode




● Communications speed: High-speed Mode

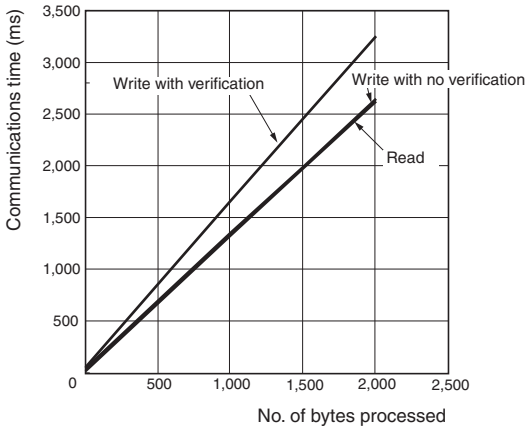



**V680-HA63B, V680-HS□□, V680-D8KF□□, and V680-D32KF□□**

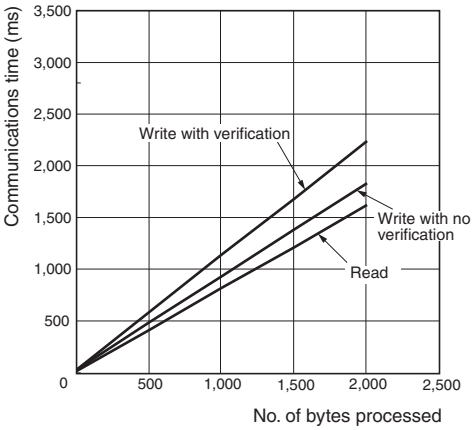
| RF Tag communications speed | Command | Communications time<br>N: Number of processed bytes |
|---|---|---|
| Normal Mode | Read | T = 1.3N + 30 |
| | Write with verification | T = 1.6N + 59 |
| | Write with no verification | T = 1.3N + 50 |
| High-speed Mode (See note.) | Read | T = 0.8N + 25 |
| | Write with verification | T = 1.1N + 41 |
| | Write with no verification | T = 0.9N + 40 |

**Note:** When using a multi-access or FIFO communications specification, the Normal Mode communications speed will be used even if the High-speed Mode is set.

● Communications speed: Normal Mode




● Communications speed: High-speed Mode

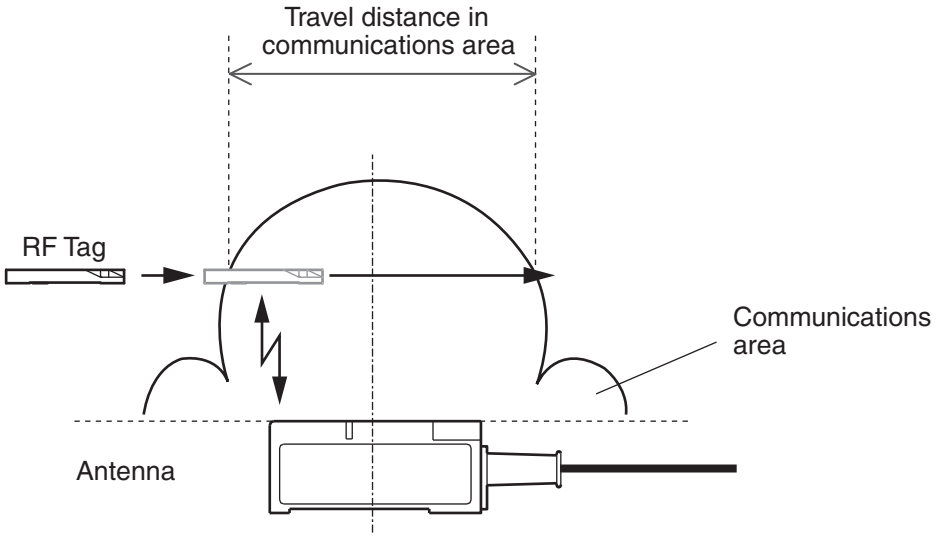


## RF Tag Travel Speed

The RF Tag travel speed can be calculated using the following formula.

Travel speed = Travel distance in communications area/communications time

The communications time is given in the graphs on the previous page. The travel distance in the communications area depends on the Antenna and the RF Tag. Refer to the user manual for the Antenna and RF Tag.




CHECK!

- The travel speed will change with the communications distance and axis displacement. We recommend using the widest part of the area.
- The above calculation formula is provided only as a guideline. Perform tests with the actual system before application.
- Communications error processing is not included in the above calculation formula.

## ■ TAT Calculation

The time from when the CS/CJ-series CPU Unit turns ON the ID Sensor Unit's Command Execution Bit until the RF Tag is communicated with and execution results are returned (i.e. the TAT, or Turnaround Time) can be calculated with the following formula.

TAT = Coefficient × Cycle time + Communications time

| Name | Description |
|---|---|
| Coefficient | (Number of Processing Bytes/160) + 3 (See note.) |
| Cycle time | Cycle time of the CS/CJ-series CPU Unit |
| Communications time | The communications time between the ID Sensor Unit and RF Tag (as previously described) |

**Note:** Round OFF the result of the Number of Processing Bytes/160.

# SECTION 7
# Troubleshooting Alarms and Errors


| | |
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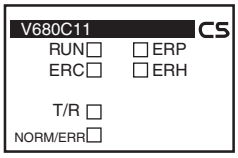
| ID Sensor Unit Alarms | 148 |
| CPU Unit Errors | 151 |
| Restarting Special I/O Units | 152 |
| Troubleshooting | 153 |

# Indicators and Error Check Flowcharts

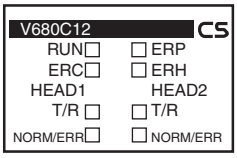
## Status Indicators

If an alarm or error occurs in the ID Sensor Unit, the ERC indicator or ERH indicator will light on the Unit's front panel.

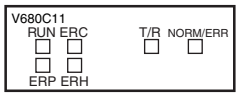
CS1W-V680C11



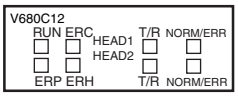

CS1W-V680C12




CJ1W-V680C11



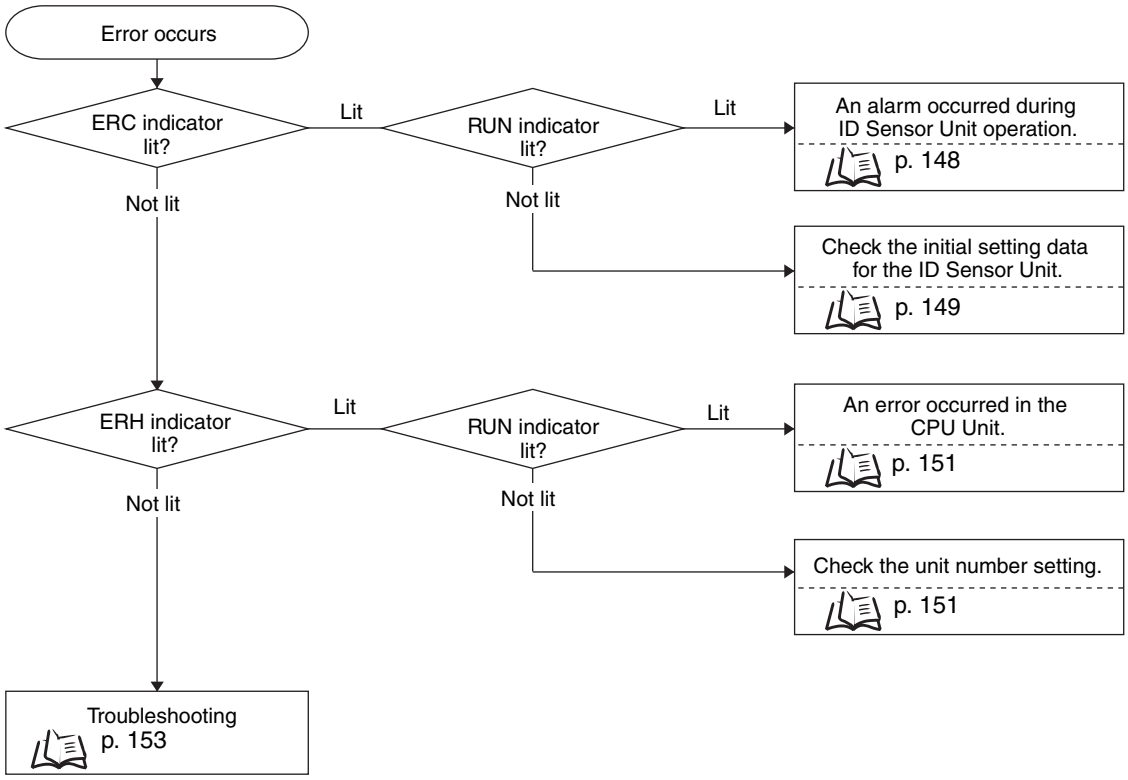

CJ1W-V680C12




| Indicator | | Name | Color | Meaning | |
|---|---|---|---|---|---|
| RUN | | RUN | Green | ❍ Lit | The ID Sensor Unit is operating normally. |
| | | | | ● Not lit | The ID Sensor Unit is stopped. |
| ERC (Error in Controller) | | Unit error | Red | ❍ Lit | An error has occurred in the ID Sensor Unit. |
| | | | | ● Not lit | No error has occurred in the ID Sensor Unit. |
| ERH (Error at CPU Unit) | | CPU Unit error | Red | ❍ Lit | An error has occurred in the CPU Unit. |
| | | | | ● Not lit | No error has occurred in the CPU Unit. |
| ERP (Antenna Power Error) | | Antenna power error | Red | ❍ Lit | An error has occurred in the power supply to the Antenna. |
| | | | | ● Not lit | The power supply to the Antenna is normal. |
| HEAD1 (Antenna 1) | T/R | Communicating | Yellow | ❍ Lit | Communications are active. |
| | | | | ● Not lit | Communications not being performed with the RF Tag. |
| | NORM/ERR | Normal end | Green | ❍ Lit | Communications with the RF Tag ended normally. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| | | Error end | Red | ❍ Lit | Communications with the RF Tag ended in an error. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| HEAD2 (Antenna 2) | T/R | Communicating | Yellow | ❍ Lit | Communications are active. |
| | | | | ● Not lit | Communications not being performed with the RF Tag. |
| | NORM/ERR | Normal end | Green | ❍ Lit | Communications with the RF Tag ended normally. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |
| | | Error end | Red | ❍ Lit | Communications with the RF Tag ended in an error. |
| | | | | ● Not lit | The indicator is not lit in all other cases. |

## Error Check Flowchart

Use the following flowchart to check the error if an error occurs in the ID Sensor Unit.



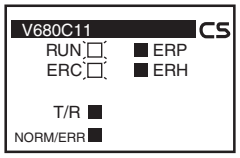
# ID Sensor Unit Alarms

The ERC indicator will light when the ID Sensor Unit detects an alarm. The relevant Alarm Flag will be turned on in the Unit Status (CIO n+7) (and, for a Two-channels ID Sensor Unit, (CIO n+17)) in the Special I/O Unit Area.

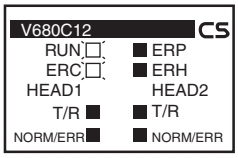
| I/O | Word address | | Bit No. | Type | Bit name | Description |
|---|---|---|---|---|---|---|
| | Antenna 1 of CS1W-V600C11, CS1W-V600C12, CJ1W-V600C11, or CJ1W-V600C12 | Antenna 2 of CS1W-V600C12 or CJ1W-V600C12 | | | | |
| Input | n+7 | n+17 | 15 | Unit Status | Unit Busy Flag | Turns ON when there is an ID Sensor Unit error. |
| | | | 14 | | Test Mode Flag | Turns ON during Test Mode. |
| | | | 13 | | Antenna Power Supply Error Flag | Turns ON when there is an error in the Unit's power supply or the external power supply. |
| | | | 12 | | EEPROM error | Turns ON when there is an error in reading EEPROM. |
| | | | 11 | | Antenna Error Flag | The DM Area setting and V680-H01 Antenna connection status do not match.<br>Too many Antennas are connected or the specified power consumption has been exceeded. |
| | | | 03 to 10 | | --- | Not used |
| | | | 02 | | Error End Flag | Turns ON for one scan when processing ends in an error. |
| | | | 01 | | Normal End Flag | Turns ON for one scan when processing ends normally. |
| | | | 00 | | ID Busy Flag | Turns ON while communications are in progress. |

## ■ Both ERC and RUN Indicators Lit

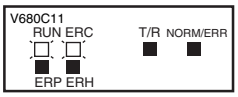
CS1W-V680C11



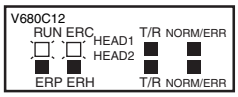

CS1W-V680C12




CJ1W-V680C11




CJ1W-V680C12




Lit:
Not Lit: ■

If both the ERC and RUN indicators are lit, an alarm occurred during Unit operation.

The Unit Busy Flag in the Unit Status (CIO n+7) (for a Two-channels ID Sensor Unit, CIO n+17 for Antenna 2) will turn ON.

The Unit will recover from this alarm automatically when the cause of the alarm is removed.

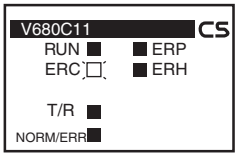
| Word address | | Name of alarm | Meaning | Unit response | Correction |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V600C11, CS1W-V600C12, CJ1W-V600C11, or CJ1W-V600C12) | Antenna 2 of CS1W-V600C12 or CJ1W-V600C12 | | | | |
| n+7 | n+17 | | | | |
| Bit 15 | | ID Sensor Unit CPU Error Flag | A CPU error occurred during ID Sensor Unit operation | Unit operation will stop. | • Turn the power supply OFF and ON or turn ON the Special I/O Unit Restart Bit.<br>• Replace the ID Sensor Unit if the error persists even though the Unit is reset. |

CHECK!

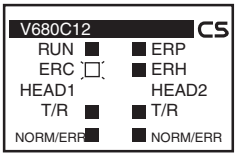
- First word allocated to Unit in CIO Area: n = CIO 2000 + 10 × Unit number

### ■ ERC Indicator Lit and RUN Indicator Not Lit

CS1W-V680C11

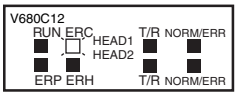



CS1W-V680C12




CJ1W-V680C11

CJ1W-V680C12




Lit: □
Not lit: ■

If the ERC indicator is lit and the RUN indicator is not lit, an alarm occurred in the ID Sensor Unit immediately after the power supply was turned ON or immediately after the Unit was restarted as a Special I/O Unit.

The Alarm Flags in the Unit Status (CIO n+7) (for a Two-channels ID Sensor Unit, (CIO n+17) for Antenna 2) will turn ON.

| Word address | | Name of alarm | Meaning | Unit response | Correction |
|---|---|---|---|---|---|
| Antenna 1 of CS1W-V600C11, CS1W-V600C12, CJ1W-V600C11, or CJ1W-V600C12) | Antenna 2 of CS1W-V600C12 or CJ1W-V600C12 | | | | |
| n+7 | n+17 | | | | |
| Bit 15 | | ID Sensor Unit CPU Error Flag | An error occurred in the ID Sensor Unit when the power supply was turned ON or immediately after the Unit was restarted. | Unit operation will stop. | • Turn the power supply OFF and ON or turn ON the Special I/O Unit Restart Bit.<br>• Replace the ID Sensor Unit if the error persists even though the Unit is reset. |
| Bit 12 | | EEPROM Error Flag | An error occurred when memory read was read. | Unit operation will stop. | • Turn the power supply OFF and ON or turn ON the Special I/O Unit Restart Bit.<br>• Replace the ID Sensor Unit if the error persists even though the Unit is reset. |

CHECK!

• First word allocated to Unit in CIO Area: n = CIO 2000 + 10 × Unit number

| Error name | Word (CIO n+8) (CIO n+18 (See note.2)) | Word (CIO n+9) (CIO n+19 (See note.2)) | Error | Correction |
|---|---|---|---|---|
| RF Tag Communications Error Flag | Bit 12 | E070 | An error occurred in communications with a RF Tag, preventing a normal end. | • Check for excessive noise.<br>• Check the travel speed.<br>• Check the distance between the Antenna and RF Tag. |
| Verification Error Flag | Bit 14 | E071 | The correct data could not be written to the RF Tag.<br>(Occurs only when verification is set for a write operation.) | • Check the travel speed. (Page 143)<br>• Check for excessive noise. |
| RF Tag Missing Error Flag | Bit 10 | E072 | • The communications specification was for a trigger, but there was no RF Tag in the communications area.<br>• The communications specification was for single auto, but the Auto Wait Time expired. | • The Antenna and RF Tag are too far apart.<br>• The axis is out of alignment. |
| ID System Error 1 | Bit 09 | E079 | System error | Please consult your OMRON representative. |
| ID System Error 2 | Bit 08 | E07E | System error | Please consult your OMRON representative. |
| ID System Error 3 | Bit 07 | E07F | System error | Please consult your OMRON representative. |
| Status Flag | Bit 04 | E076 | • An overflow or underflow occurred for a Calculation Write command.<br>• The data did not verify for a Data Check command.<br>• The number of writes was exceeded for a Number of Writes Control command.<br>• An error occurred in the data for a Read with Error Correction command. | • Check the data settings.<br>• Replace the RF Tag. |
| | | | • An error occurred while writing for a Copy command. | (See note.1) |
| RF Tag Address Error Flag | Bit 13 | E07A | The RF Tag address specified in the command is not correct. | • Specify the address correctly. |
| Antenna Error Flag | Bit 15 | E07C | An Antenna error occurred. | • Check 24 VDC input. (CS1W-V680C12 only)<br>• Check the Antenna. |
| Write Protection Error Flag | Bit 11 | E07D | An attempt was made to write to a write-protected area. | • Specify the address and number of bytes correctly.<br>• Clear write protection. (Page 95) |
| Error Correction Flag | Bit 03 | E077 | Read with Error Correction performed a 1-bit error correction. | --- |
| Data Storage Area Specification Error Flag | Bit 01 | E014 | The data storage area specification is not correct. | Specify the data storage area specification correctly. |
| Command Error Flag | Bit 00 | E014 | The command to the ID Sensor Unit is not correct. | Specify the command correctly. |

**Note 1:** The following errors may occur while writing for a Copy command. Confirm the steps to handle each error.
- RF Tag communications error
- RF Tag verification error
- RF Tag missing error
- RF Tag address error
- Antenna error
- Write protection error

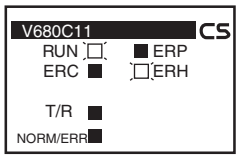
**Note 2:** CIO n+8, CIO n+9 are error information of Antenna 1 (Head No.1).
CIO n+18, CIO n+19 are error information of Antenna 2 (Head No.2).

# CPU Unit Errors

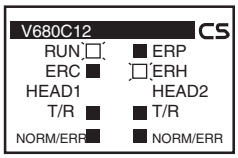
The ERH indicator will light when the ID Sensor Unit cannot operate because an error occurred on the I/O bus to the CPU Unit or when data cannot be refreshed as a Special I/O Unit.

## ■ Both ERH and RUN Indicators Lit

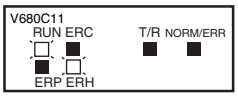
CS1W-V680C11



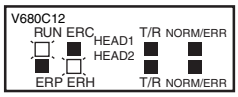

CS1W-V680C12




CJ1W-V680C11




CJ1W-V680C12



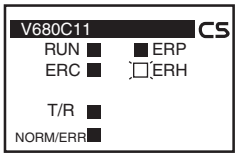

Lit: □
Not lit: ■

The ERH and RUN indicators will light when an error occurs on the I/O bus or a WDT (watchdog timer) error occurs in the CPU Unit, preventing data from being correctly refreshed for the ID Sensor Unit as a Special I/O Unit. If this happens, either turn the power supply OFF and ON or restart the system. Refer to the *SYSMAC CS/CJ-series Programmable Controllers Operation Manual* for details.

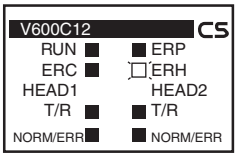
| Error name | Error | Unit response |
|---|---|---|
| I/O bus error | An error occurred in data transfer between the CPU Unit and the ID Sensor Unit. | Unit operation will stop. |
| CPU Unit monitor error | An error occurred because there was no response from the CPU Unit. | |
| CPU Unit WDT error | An error occurred in the CPU Unit. | |

## ■ ERH Indicator Lit and RUN Indicator Not Lit

CS1W-V680C11

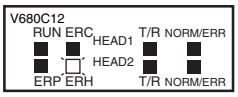



CS1W-V680C12




CJ1W-V680C11

CJ1W-V680C12




Lit: □
Not lit: ■

There is an error in the unit number setting for the ID Sensor Unit.

| Error name | Error | Unit response |
|---|---|---|
| Unit number duplication | The same unit number is set for more than one Unit or was set to a value that is not between 00 and 95. | Unit operation will stop. |
| Special I/O Unit setting error | The model of Special I/O Unit registered in the I/O table does not agree with the model of Special I/O Unit mounted in the system. | |

# Restarting Special I/O Units

To restart operation after changing settings in the DM Area or after removing the cause of an error, either turn the PLC's power supply OFF and ON or turn ON the Special I/O Unit Restart Bit.

### • CS-series Special I/O Unit Restart Bits

| Bit address | Function | |
|---|---|---|
| A50200 | Unit 0 Restart Bit | The Unit will be restarted when the corresponding bit is turned ON. After the Unit has finished restarting, the corresponding bit will be automatically turned OFF. |
| A50201 | Unit 1 Restart Bit | |
| ⋮ | ⋮ | |
| A50215 | Unit 15 Restart Bit | |
| A50300 | Unit 16 Restart Bit | |
| ⋮ | ⋮ | |
| A50715 | Unit 95 Restart Bit | |

### • CJ-series Special I/O Unit Restart Bits

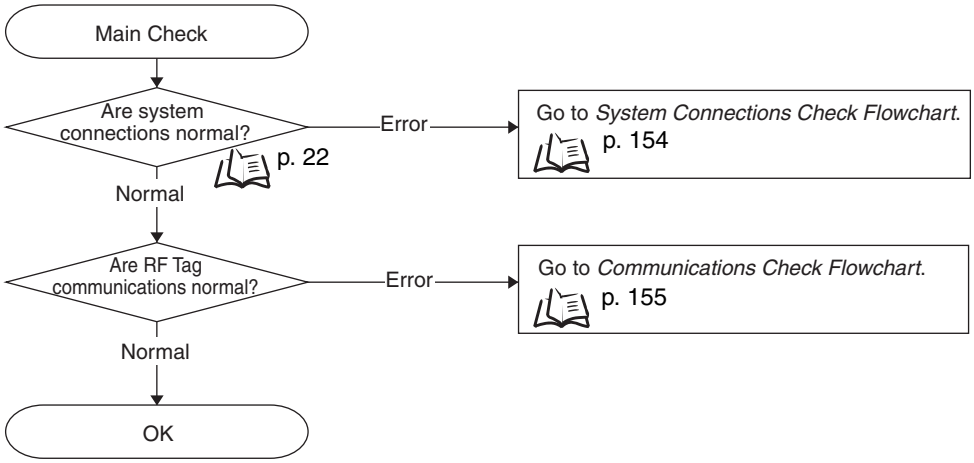
| Bit address | Function | |
|---|---|---|
| A50200 | Unit 0 Restart Bit | The Unit will be restarted when the corresponding bit is turned ON. After the Unit has finished restarting, the corresponding bit will be automatically turned OFF. |
| A50201 | Unit 1 Restart Bit | |
| ⋮ | ⋮ | |
| A50215 | Unit 15 Restart Bit | |
| A50300 | Unit 16 Restart Bit | |
| ⋮ | ⋮ | |
| A50715 | Unit 95 Restart Bit | |

- If an error persists even though the power supply is turned OFF and ON or the Special I/O Unit Restart Bit is turned ON, replace the ID Sensor Unit, Power Supply Unit, or CPU Unit.

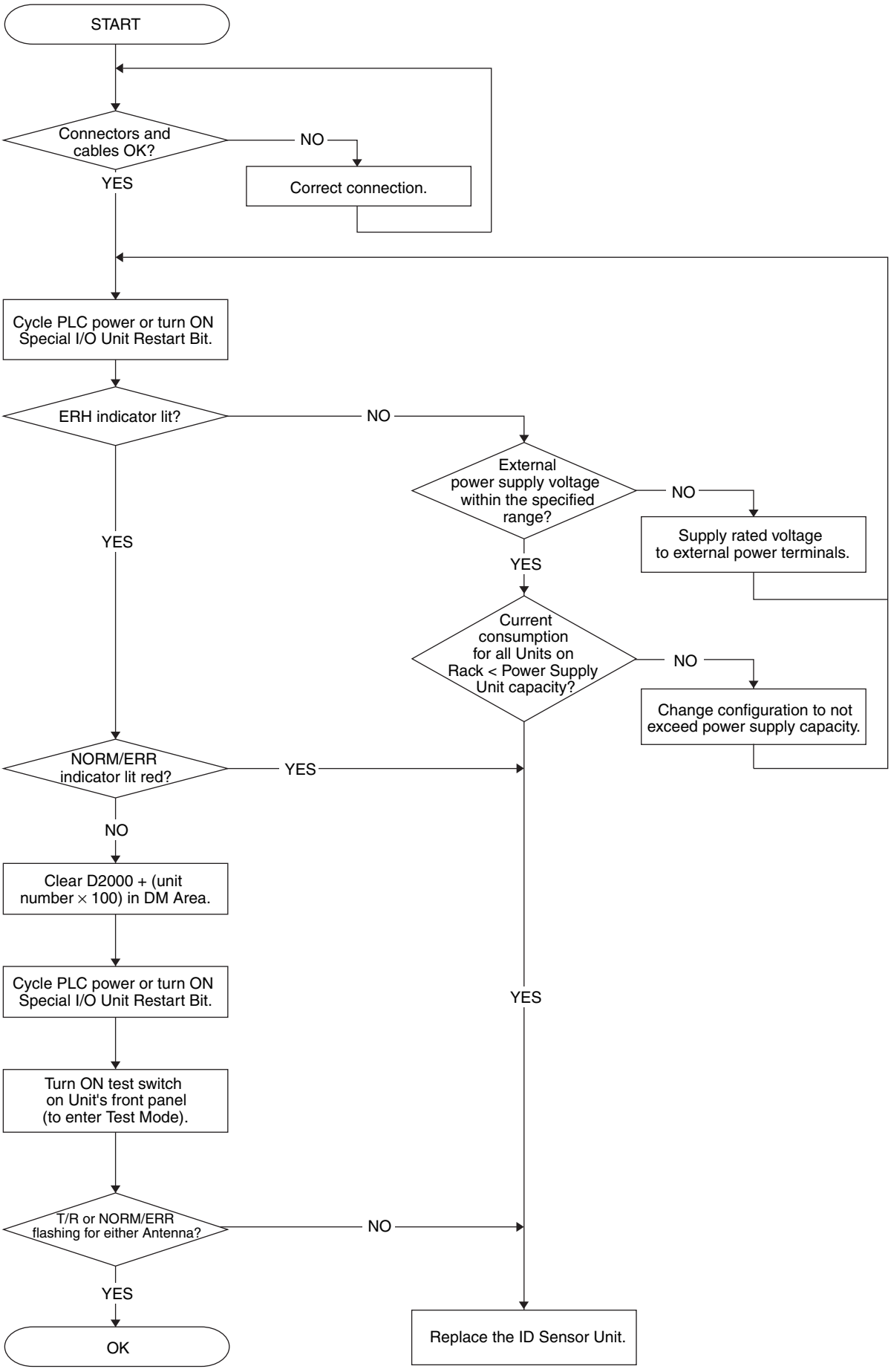
# Troubleshooting

## Main Check Flowchart

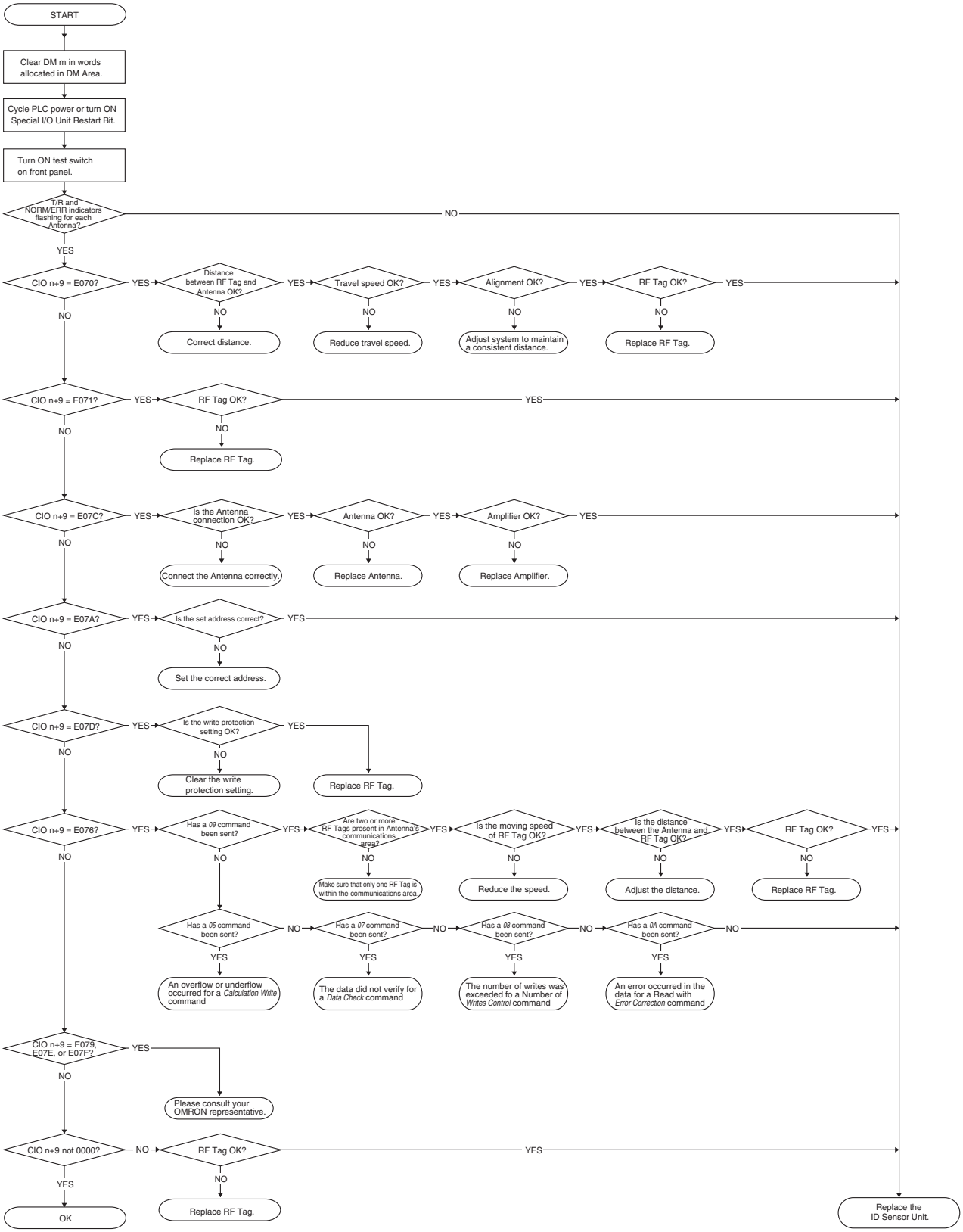
Use the Main Check Flowchart according to the nature of the error.



# System Connections Check Flowchart


START
Connectors and cables OK?
NO
Correct connection.
YES
Cycle PLC power or turn ON Special I/O Unit Restart Bit.
ERH indicator lit?
NO
External power supply voltage within the specified range?
NO
Supply rated voltage to external power terminals.
YES
YES
Current consumption for all Units on Rack < Power Supply Unit capacity?
NO
Change configuration to not exceed power supply capacity.
NORM/ERR indicator lit red?
YES
NO
Clear D2000 + (unit number × 100) in DM Area.
Cycle PLC power or turn ON Special I/O Unit Restart Bit.
Turn ON test switch on Unit's front panel (to enter Test Mode).
T/R or NORM/ERR flashing for either Antenna?
NO
YES
OK
YES
Replace the ID Sensor Unit.

# Communications Check Flowchart




CHECK!

- First word allocated to Unit in DM Area: m = D20000 + 100 × Unit number
- First word allocated to Unit in CIO Area: n = CIO 2000 + 10 × Unit number

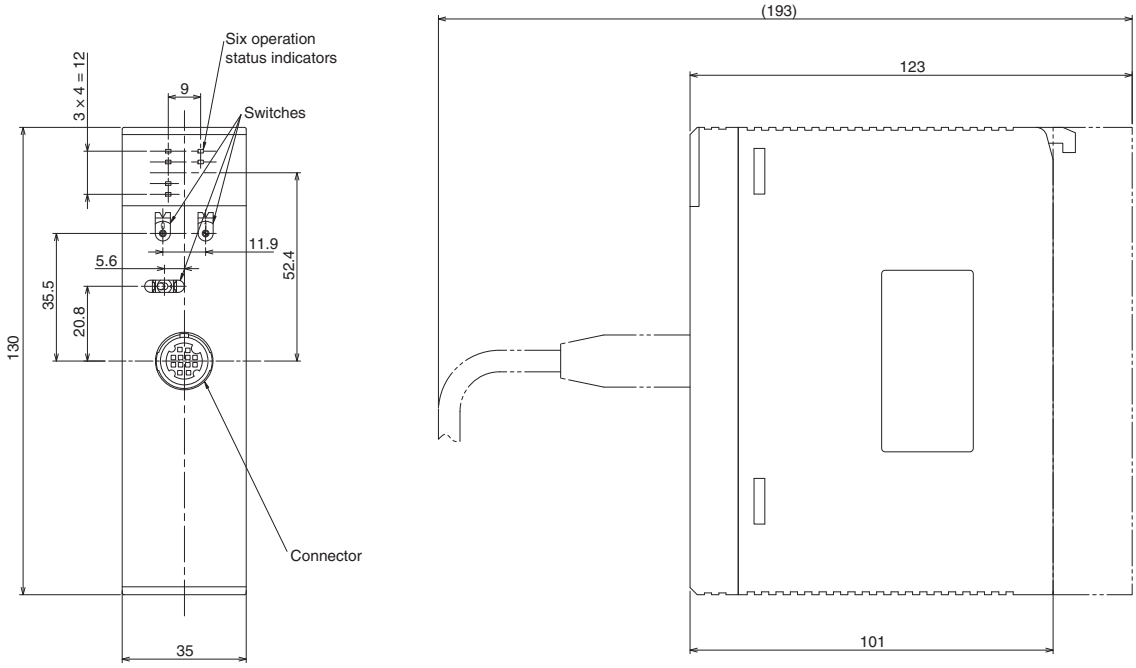
MEMO

# SECTION 8
# Appendices

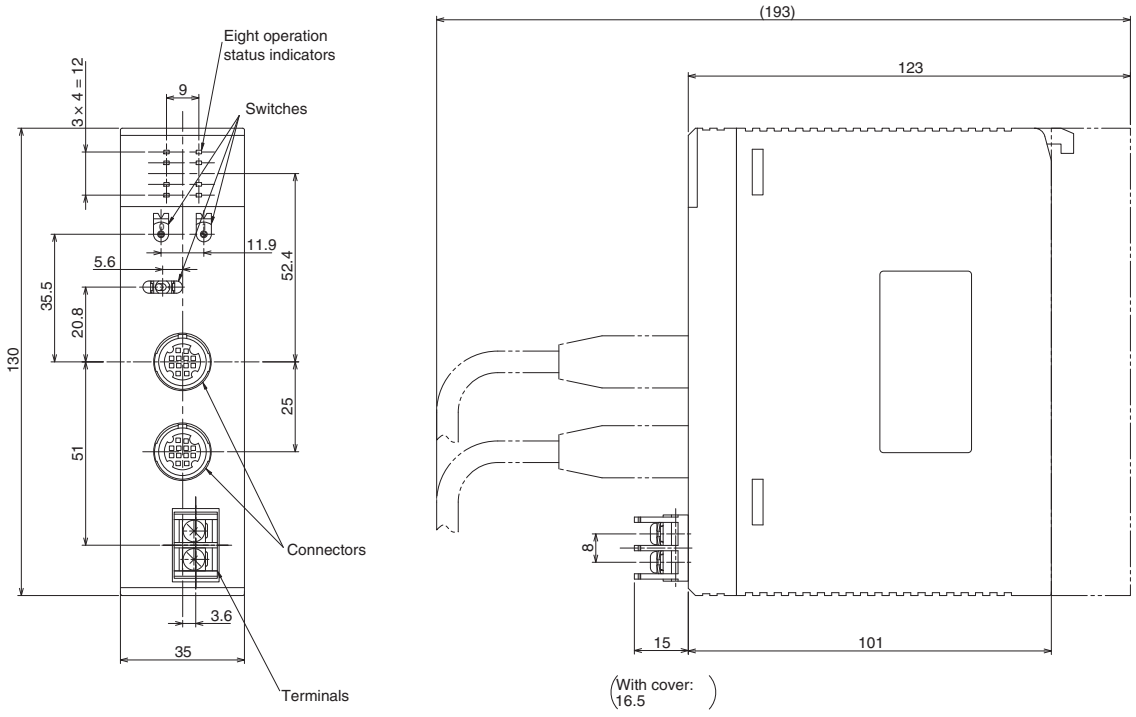

| | |
|---|---|
| Dimensions | 158 |
| Sample Programming | 160 |
| Data Coding Tables | 204 |
| Degree of Protection | 208 |

# Dimensions

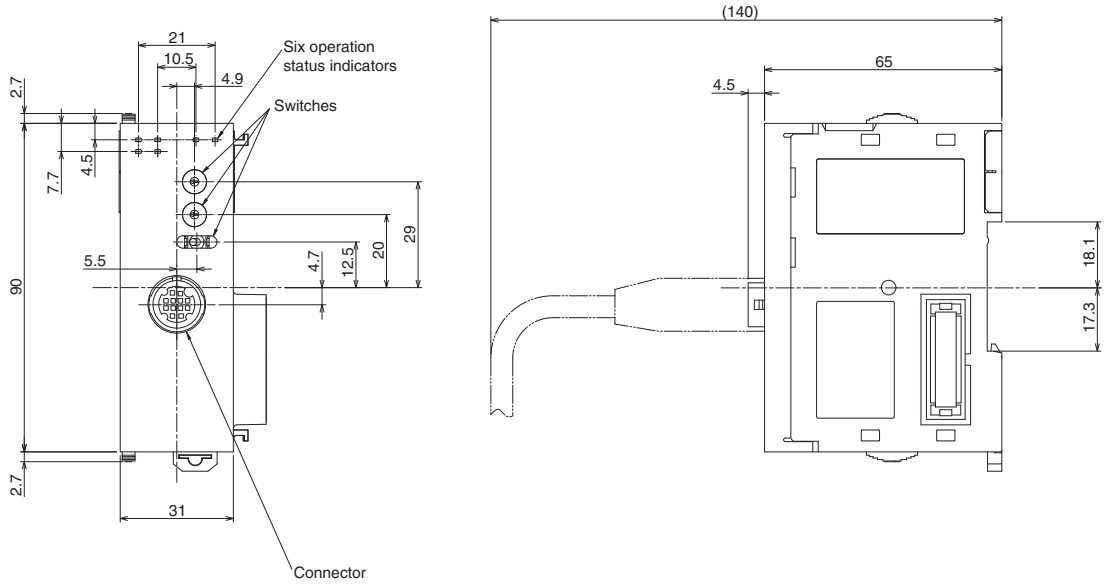
## CS1W-V680C11



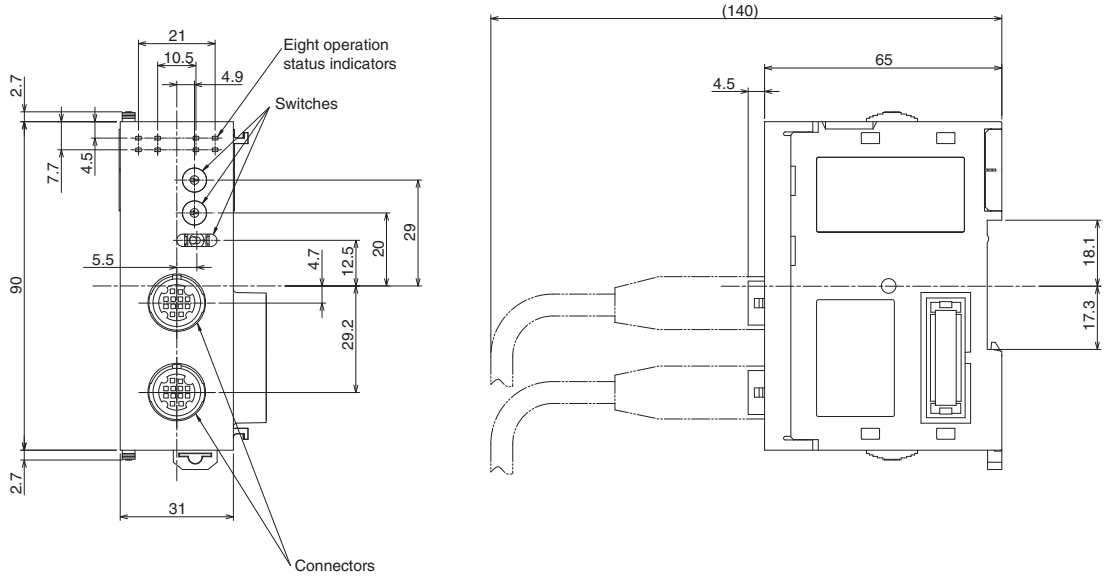

## CS1W-V680C12



## CJ1W-V680C11




## CJ1W-V680C12

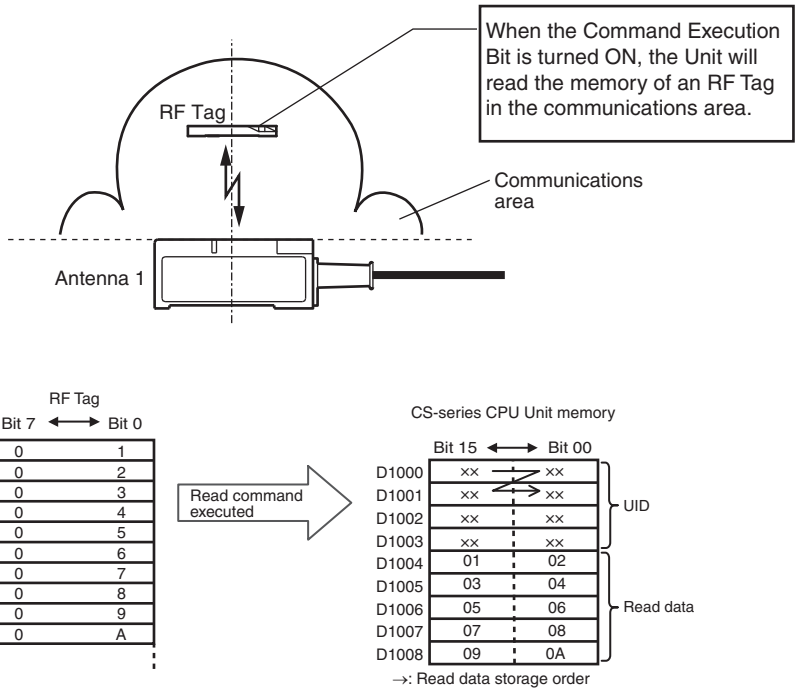


# Sample Programming

## Read, Communications Specification: Trigger

### • Outline

This example shows how to read the memory of an RF Tag that is present in the communications area for Antenna 1.




Unit Settings

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 00 | Unit's front panel unit number switches: 00 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Enabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode<br>Data transfer setting: Cyclic | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | Infinite | |
| Command | Read | Set in the Special I/O Unit Area. |
| Communications specification | Trigger | |
| Read data storage order | Leftmost → Rightmost | |
| Read start address | 0010 hex | |
| Number of bytes to read | 10 bytes | |
| Read data storage destination | D1000 to D1004 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 1 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20001 | 0000 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

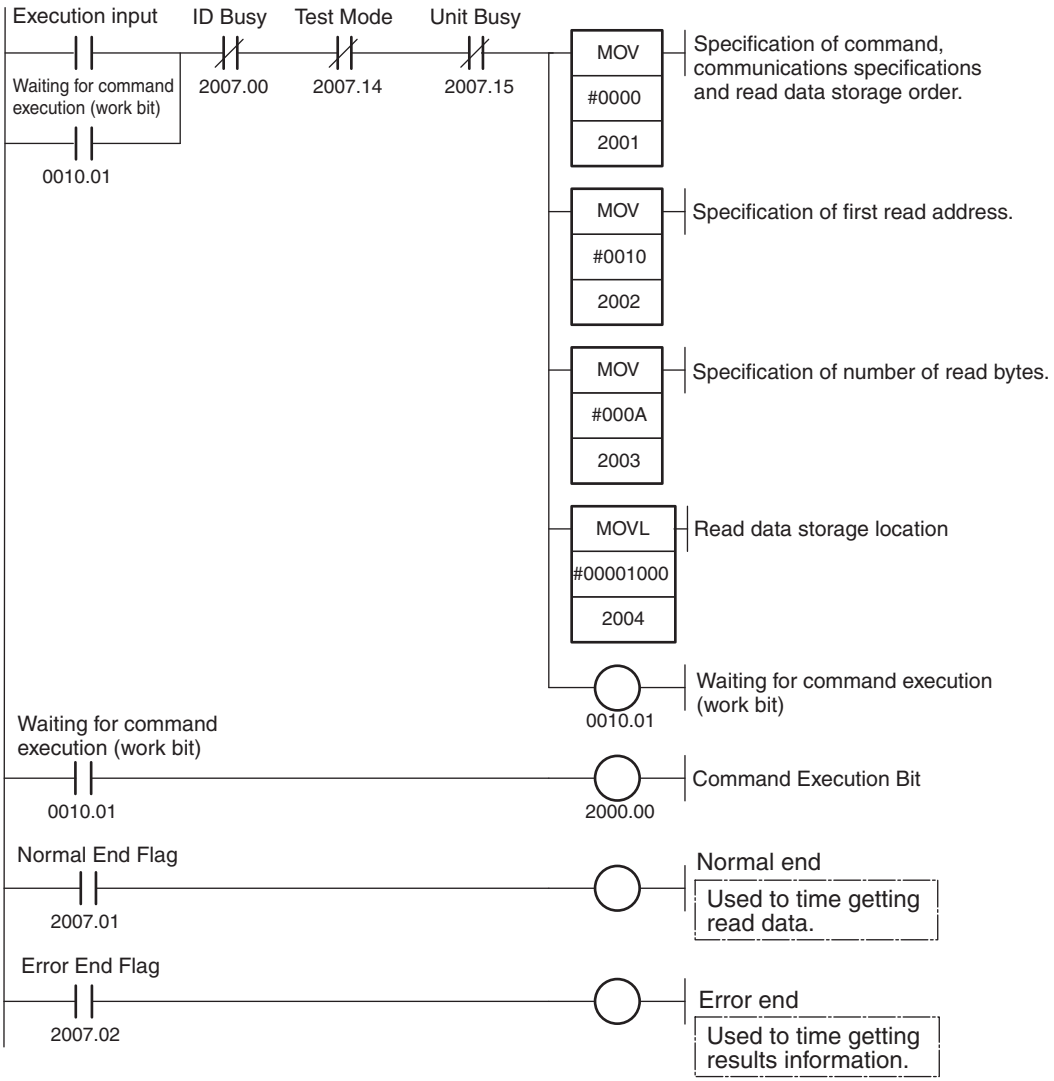
First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 0) = CIO 2000

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0 | 0 | 0 | 0 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 | | 10 | | First read address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 | | 0A | | Number of read bytes | | | | | | | | | | | | | | | |
| CIO 2004 | 10 | | 00 | | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 | 0 | 00 | | Data storage area | | | | Bank specification (Always 0) | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2006 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

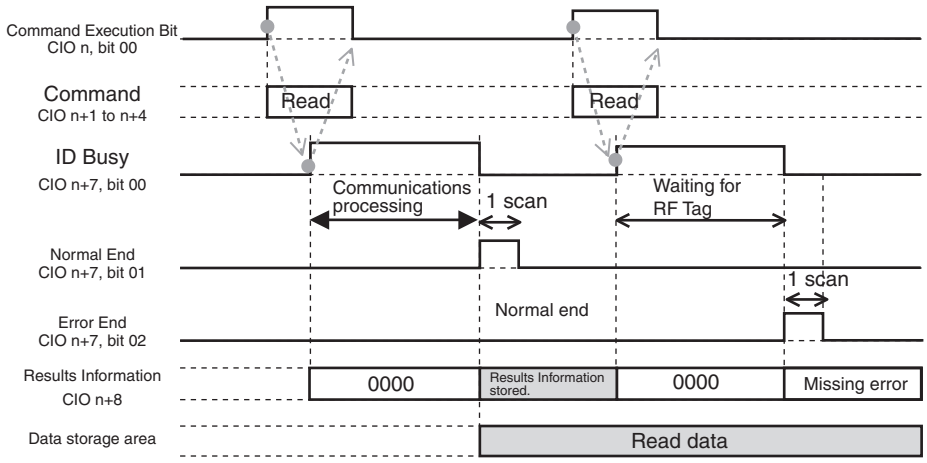
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV and MOVL instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON. Read data can be used after the Normal End Flag (CIO n+7, bit 01) has been turned ON.
To end command execution while waiting for the RF Tag, turn ON the Abort Input.



## • Timing Chart (CIO n = CIO 2000 + (10 x 0) = CIO 2000)

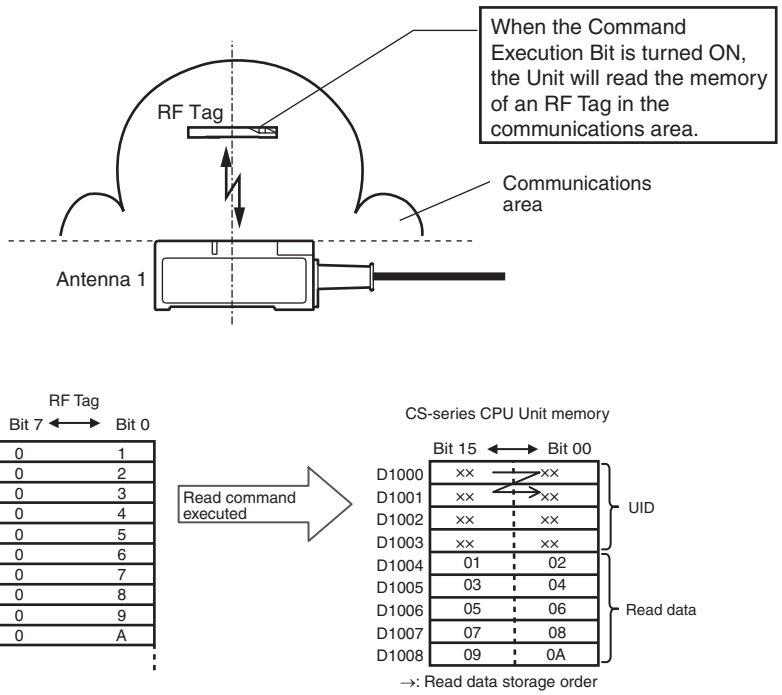



- If communications with the RF Tag fail or an error occurs, communications will be aborted at that point, the error flags in the Results Information (CIO n+8) will turn ON accordingly, and the error code will be placed in the Processing Results Monitor (CIO n+9). The previous read data will not be changed.
- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Read, Communications Specification: Trigger, Data Transfer: Intelligent I/O Instructions

## • Outline

This example shows how to read the memory of an RF Tag that is present in the communications area for Antenna 1.




Unit Settings

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 00 | Unit's front panel unit number switches: 00 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode<br>Data Transfer Setting: Intelligent I/O Instructions | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | Infinite | |
| Command | Read | Set in the Special I/O Unit Area. |
| Communications specification | Trigger | |
| Read data storage order | Leftmost → Rightmost | |
| Read start address | 0020 hex | |
| Number of bytes to read | 512 bytes | Set in IORD instruction. |
| Read data storage destination | D20920 to D21431 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 1 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20001 | 0000 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |
| D20090 | 0001 | | | | Data Transfer Setting | | | | | | | | | | | | | | | |

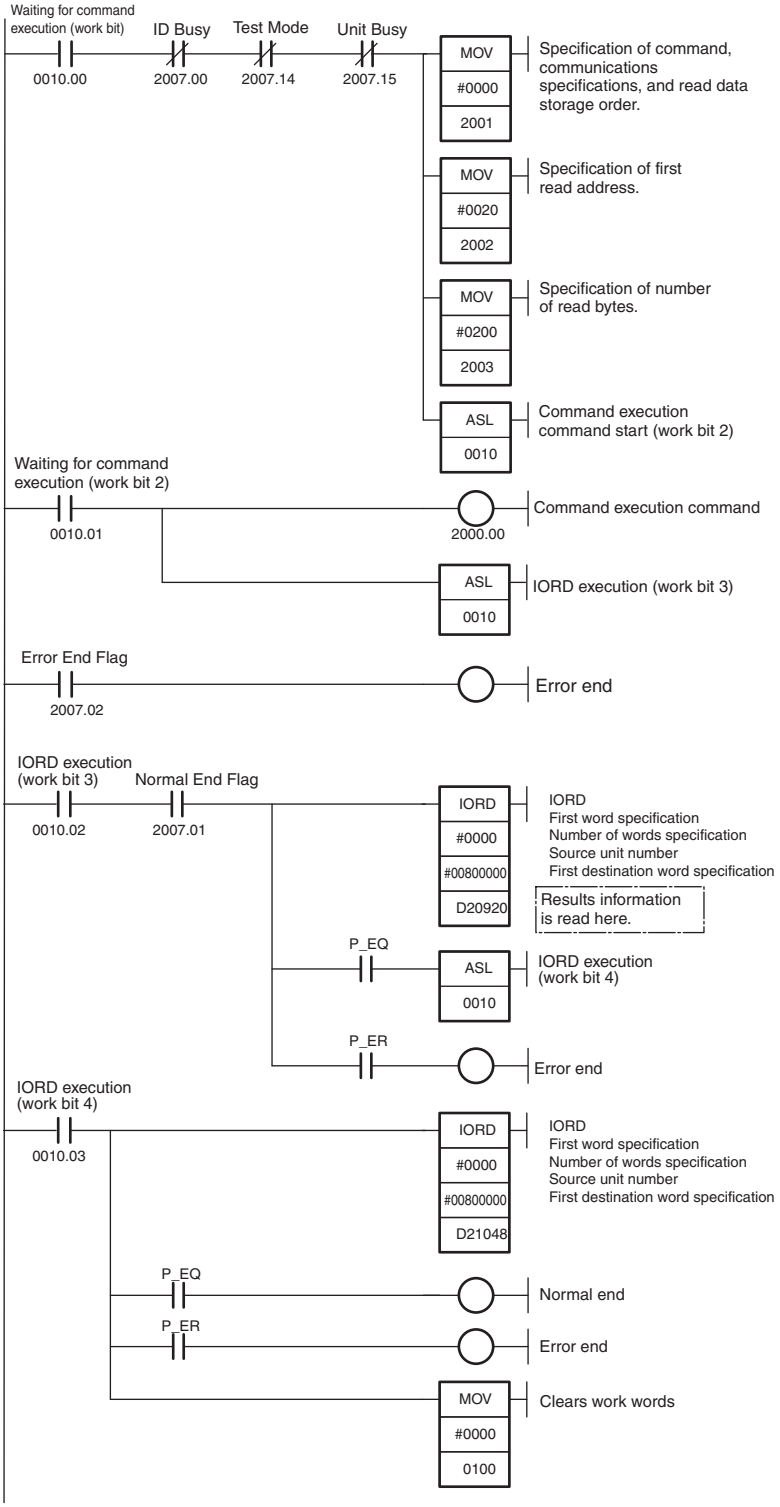
First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 0) = CIO 2000

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0 | 0 | 0 | 0 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 | | 10 | | Read start address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 | | 0A | | Number of bytes to read | | | | | | | | | | | | | | | |
| CIO 2004 | 10 | | 00 | | --- | | | | | | | | | | | | | | | |
| CIO 2005 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |
| CIO 2006 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

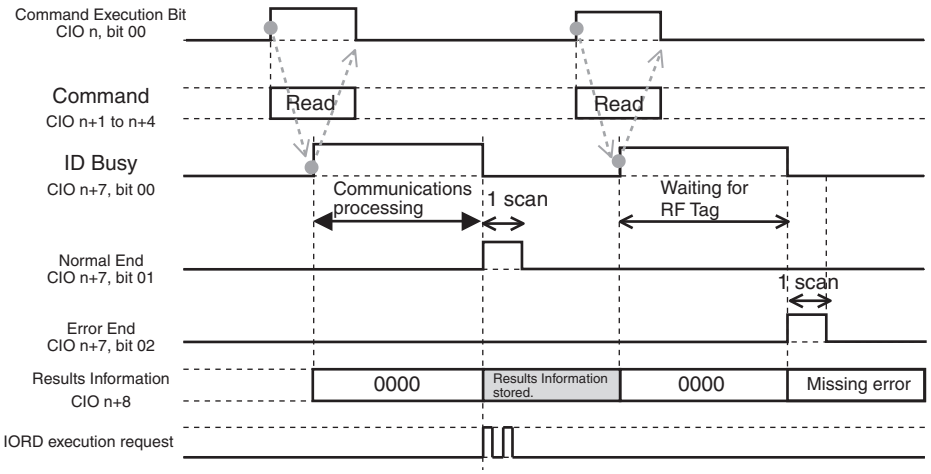
---: Ignored.

## • Programming Example

The following ladder programming uses the Read command and the IORD instruction to read 512 bytes of data. The IORD instruction is executed twice to read 256 bytes (128 words) each time. When the execution input turns ON, settings are made in the Special I/O Unit Area using MOV instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON. The IORD instruction is executed after the Normal End Flag (CIO n+7, bit 01) turns ON.
To end command execution while waiting for the RF Tag, turn ON the Abort Input.



## • Timing Chart (CIO n = CIO 2000 + (10 x 0) = CIO 2000)

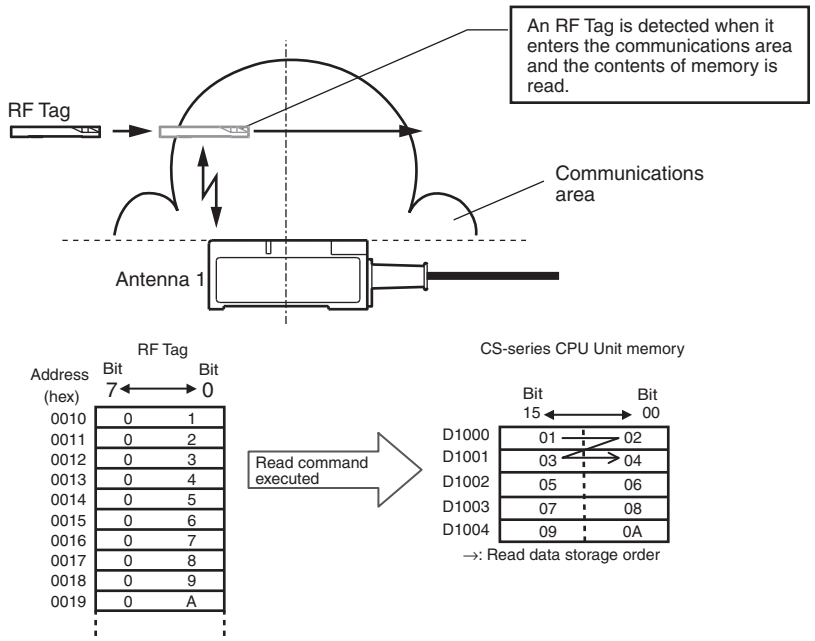



- If communications with the RF Tag fail, the bits in the Results Information (CIO n+8) will turn ON accordingly, and the error code will be placed in the Processing Results Monitor (CIO n+9). The previous read data will not be changed.
- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag. These flags show the Unit status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.
- Execute the IORD instruction after the Normal End Flag turns ON.

# Read, Communications Specification: Single Auto

## • Outline

This example shows how to read the memory of an RF Tag as it enters the communications area for Antenna 1.




## • Unit Setting Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 00 | Unit's front panel unit number switches: 00 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | Infinite | |
| Command | Read | Set in the Special I/O Unit Area. |
| Communications specification | Single auto | |
| Read data storage order | Leftmost → Rightmost | |
| Read start address | 0010 hex | |
| Number of bytes to read | 10 bytes | |
| Read data storage destination | D1000 to D1004 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20001 | 0000 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

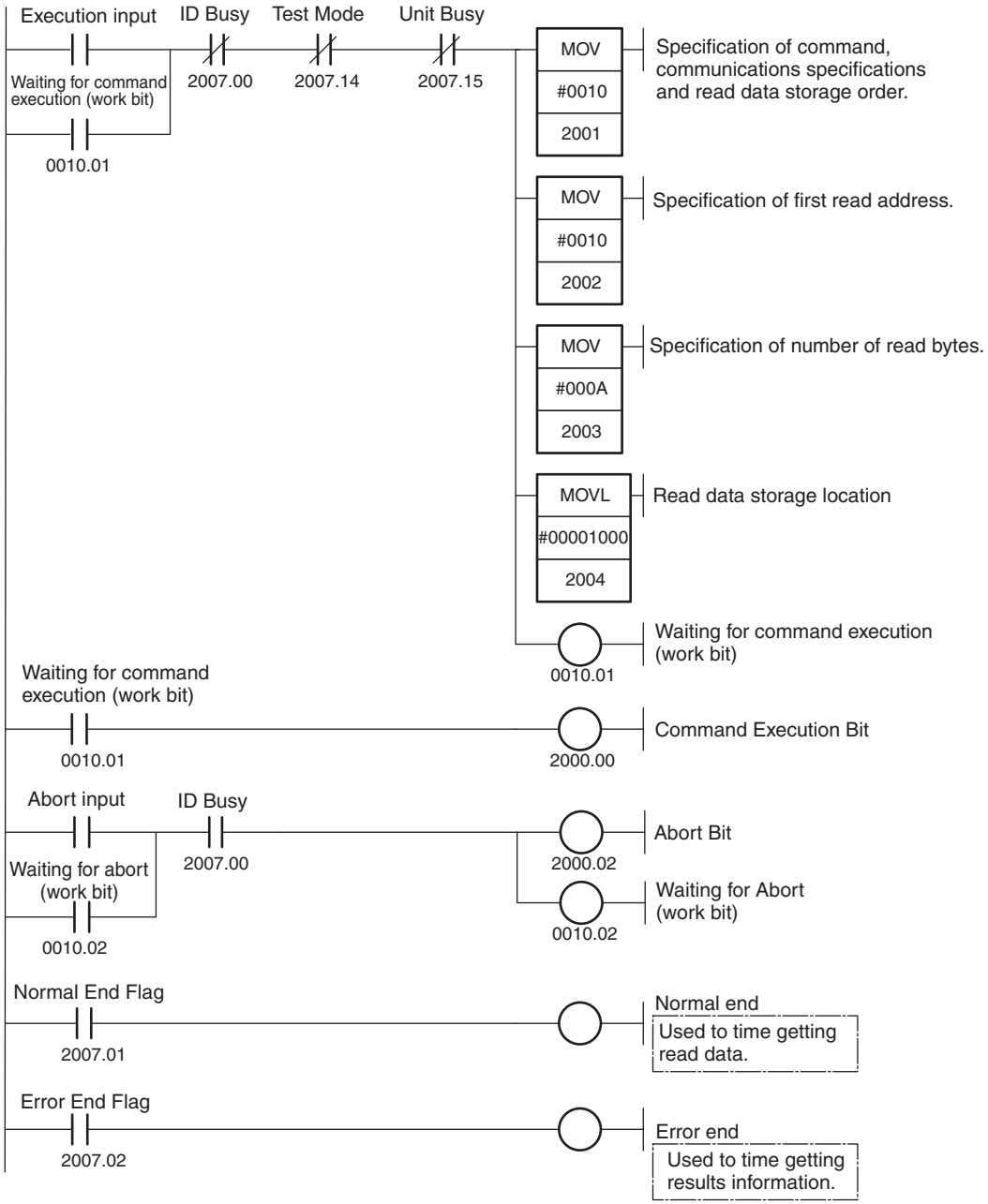
First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 0) = CIO 2000

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0 | 0 | 1 | 0 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 | | 10 | | First read address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 | | 0A | | Number of read bytes | | | | | | | | | | | | | | | |
| CIO 2004 | 10 | | 00 | | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 | 0 | 00 | | Data storage area | | | | Bank specification (Always 0) | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2006 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

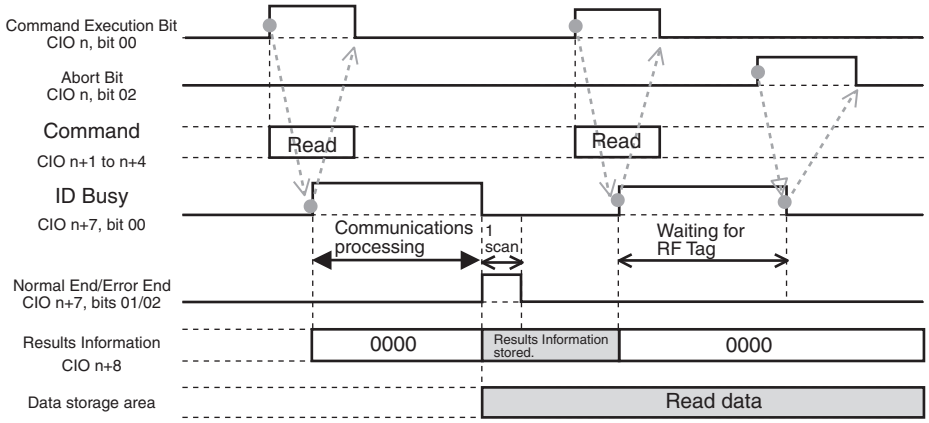
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV and MOVL instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON. Read data can be used after the Normal End Flag (CIO n+7, bit 01) has been turned ON.
To end command execution while waiting for the RF Tag, turn ON the Abort Input.



## • Timing Chart (CIO n = CIO 2000 + (10 x 0) = CIO 2000)

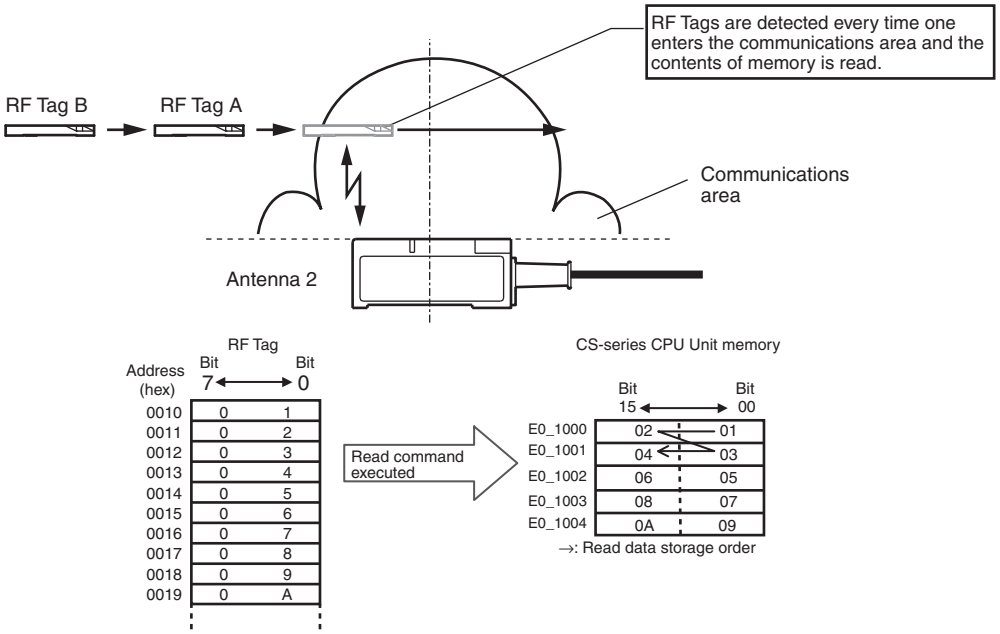



- If communications with the RF Tag fail or an error occurs, communications will be aborted at that point, the error flags in the Results Information (CIO n+8) will turn ON accordingly, and the error code will be placed in the Processing Results Monitor (CIO n+9). The previous read data will not be changed.
- If the Abort Bit is turned ON while waiting for an RF Tag, communications will be aborted at that point. The Results Information (CIO n+8) will always be 0000 hex in this case.
- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Read, Communications Specification: Repeat Auto

## • Outline

This example shows how to repeatedly read the data in the memory of RF Tags from Antenna 2. An auto wait time is set so that operation will be ended if an RF Tag is not detected within a specified period of time.




## • Unit Settings Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 01 | Unit's front panel unit number switches: 01 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | 15 s | |
| Command | Read | Set in the Special I/O Unit Area. |
| Communications specification | Repeat auto | |
| Read data storage order | Rightmost → Leftmost | |
| Read Start address | 0010 hex | |
| Number of bytes to read | 10 bytes | |
| Read data storage destination | E0_1000 to E0_1004 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × (0 + 1)) = D20100

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20100 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20101 | 0150 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

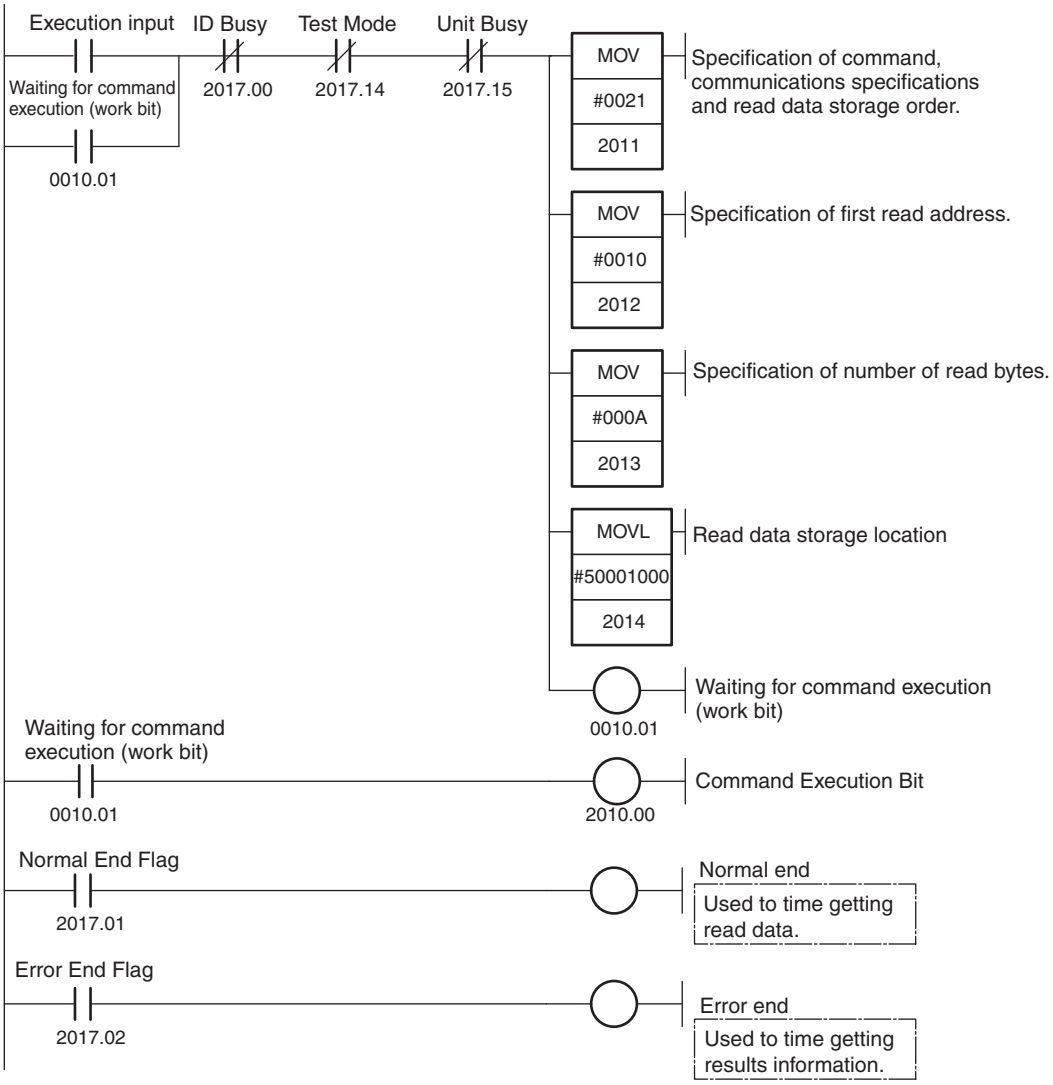
First word allocated to Unit in CIO Area: n = CIO 2000 + 10 × (0+ 1) = CIO 2010

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2011 | 0 | 0 | 2 | 1 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2012 | 00 | | 10 | | First read address | | | | | | | | | | | | | | | |
| CIO 2013 | 00 | | 0A | | Number of read bytes | | | | | | | | | | | | | | | |
| CIO 2014 | 10 | | 00 | | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2015 | 5 | 0 | 00 | | Data storage area | | | | Bank specification | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2016 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

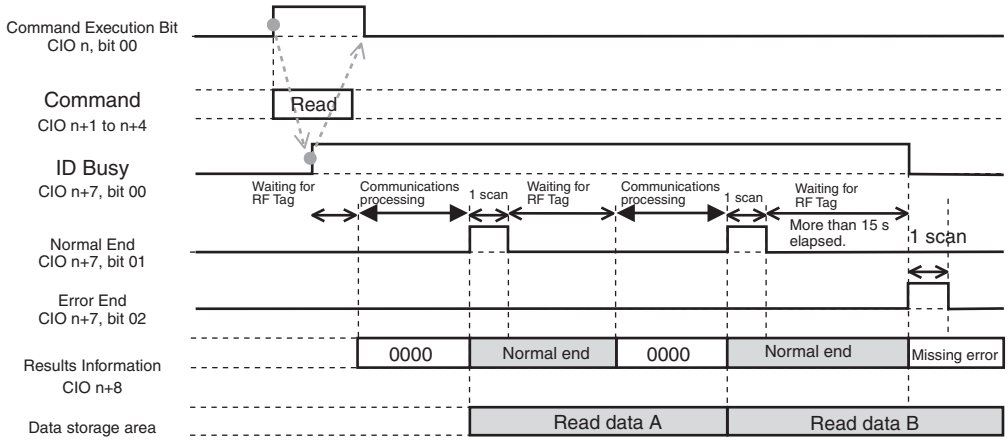
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV and MOVL instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON. Read data can be used after the Normal End Flag (CIO n+7, bit 01) has been ON.
If more than 15 seconds elapse while waiting for the RF Tag, the operation will be ended.



### • Timing Chart (CIO n = CIO 2000 + 10 x (0 + 1) = CIO 2010)

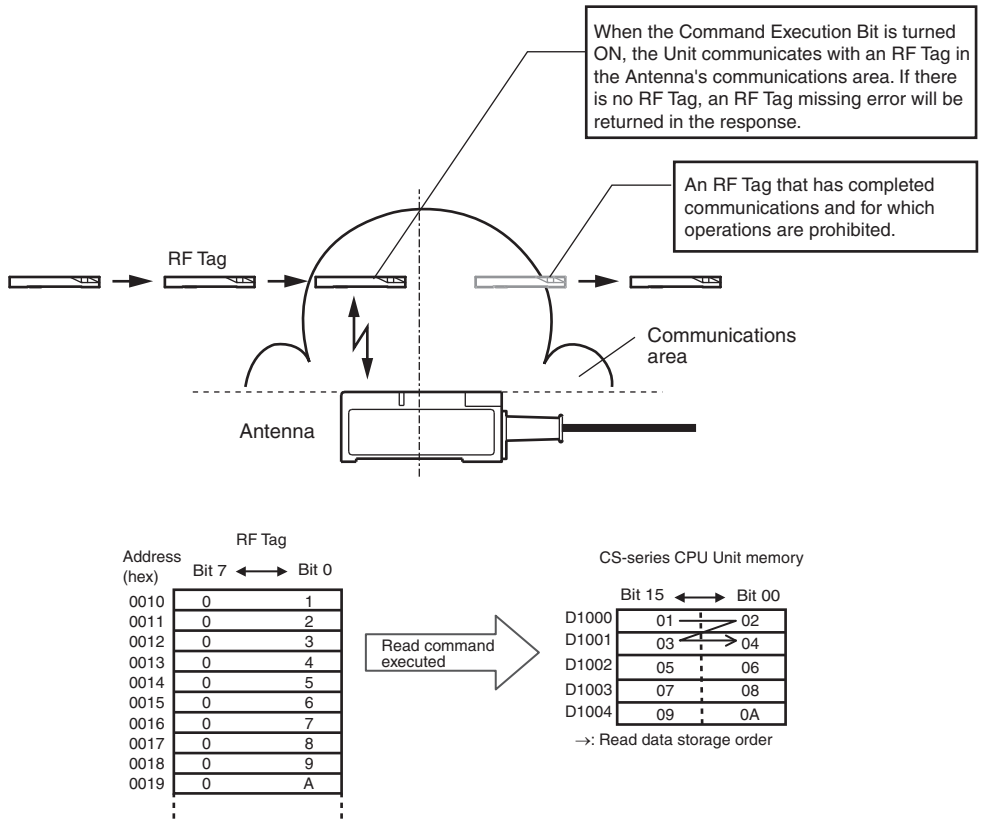



- If communications with the RF Tag fail or an error occurs, communications will be aborted at that point, the error flags in the Results Information (CIO n+8) will turn ON accordingly, and the error code will be placed in the Processing Results Monitor (CIO n+9). The previous read data will not be changed.
- If an auto wait time is set and the set time expires while waiting for an RF Tag, the command operation will be aborted at that point, the RF Tag Missing Error Flag (CIO n+8, bit 10) in the Results Information will turn ON, and an error code will be placed in the Processing Results Monitor (CIO n+9).
- When the communications specification is set to repeat auto, either the Normal End Flag or the Error End Flag will turn ON every scan for consecutive scans. The execution results can be correctly determined by using the ON status of both the Normal End Flag and the Error End Flag in Unit Status.
- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Read, Communications Specification: FIFO Trigger

## • Outline

This example shows how to read the memory of an RF Tag that is present in the communications area for Antenna 1.


When the Command Execution Bit is turned ON, the Unit communicates with an RF Tag in the Antenna's communications area. If there is no RF Tag, an RF Tag missing error will be returned in the response.
An RF Tag that has completed communications and for which operations are prohibited.
RF Tag
Communications area
Antenna
RF Tag
Address (hex)
Bit 7
Bit 0
0010 0 1
0011 0 2
0012 0 3
0013 0 4
0014 0 5
0015 0 6
0016 0 7
0017 0 8
0018 0 9
0019 0 A
Read command executed
CS-series CPU Unit memory
Bit 15
Bit 00
D1000 01 02
D1001 03 04
D1002 05 06
D1003 07 08
D1004 09 0A
→: Read data storage order

## • Unit Settings Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 00 | Unit's front panel unit number switches: 00 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | Infinite | |
| Command | Read | Set in the Special I/O Unit Area. |
| Communications specification | FIFO trigger | |
| Read data storage order | Leftmost → Rightmost | |
| Read Start address | 0010 hex | |
| Number of bytes to read | 10 bytes | |
| Read data storage destination | D1000 to D1004 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20001 | 0000 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

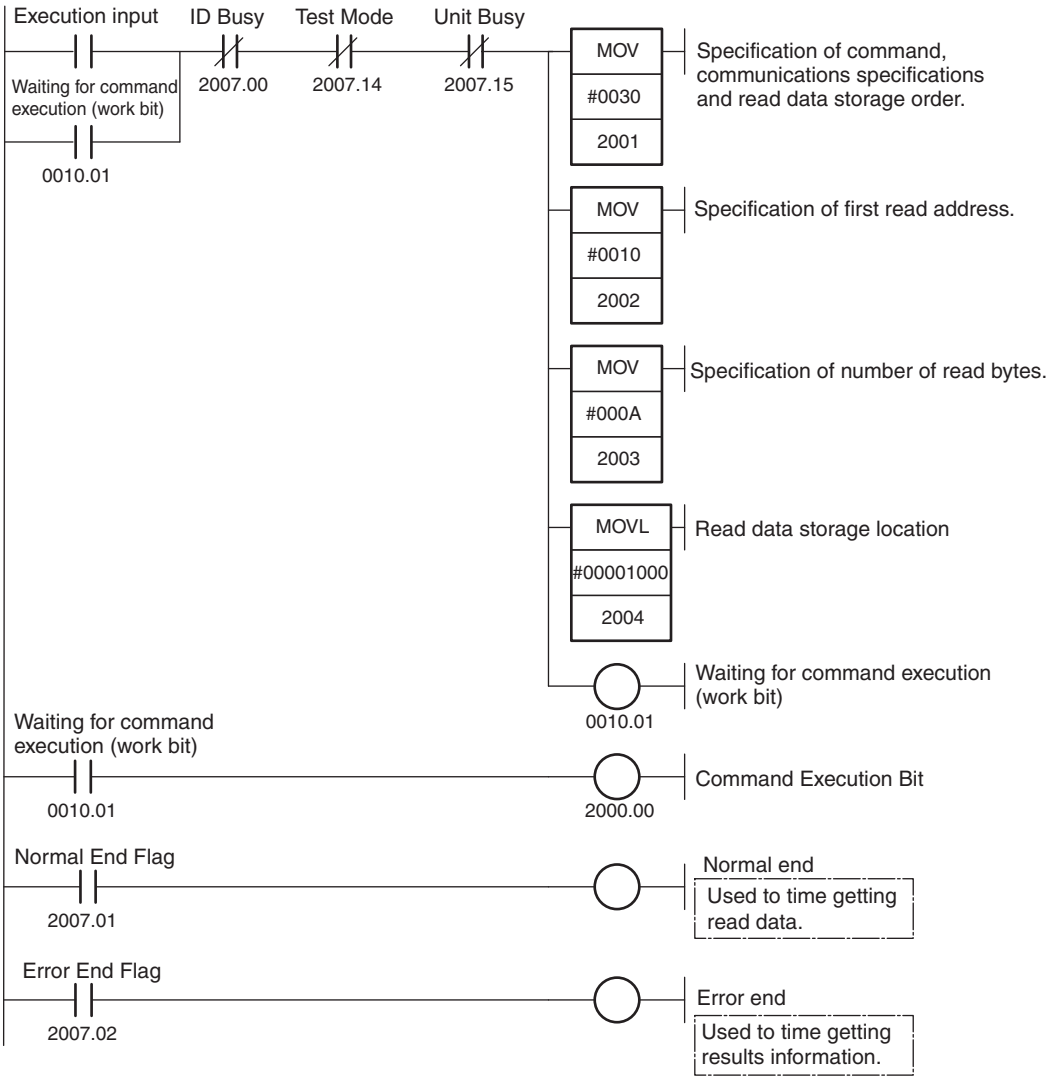
First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 0) = CIO 2000

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0 | 0 | 3 | 1 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 | | 10 | | First read address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 | | 0A | | Number of read bytes | | | | | | | | | | | | | | | |
| CIO 2004 | 10 | | 00 | | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 | 0 | 00 | | Data storage area | | | | Bank specification (Always 0) | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2006 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

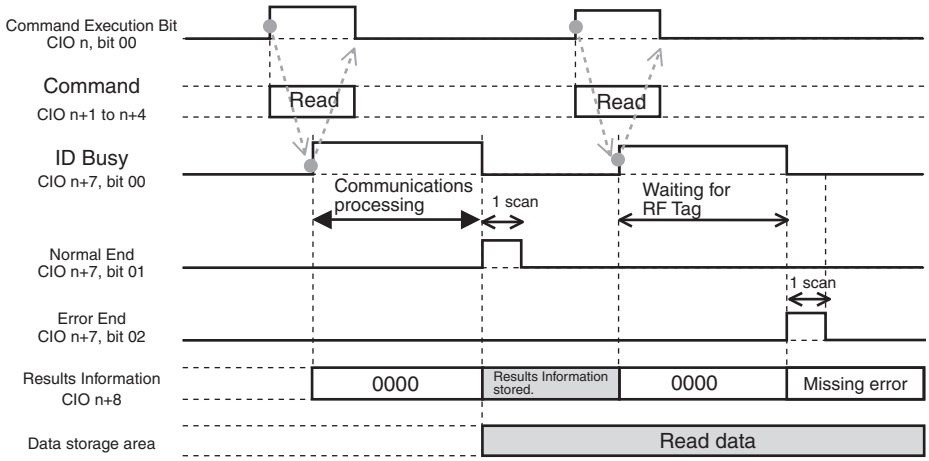
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV and MOVL instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON. Read data can be used after the Normal End Flag (CIO n+7, bit 01) has been ON.
To end command execution while waiting for the RF Tag, turn ON the Abort input.



## • Timing Chart (CIO n = CIO 2000 + (10 x 0) = CIO 2000)

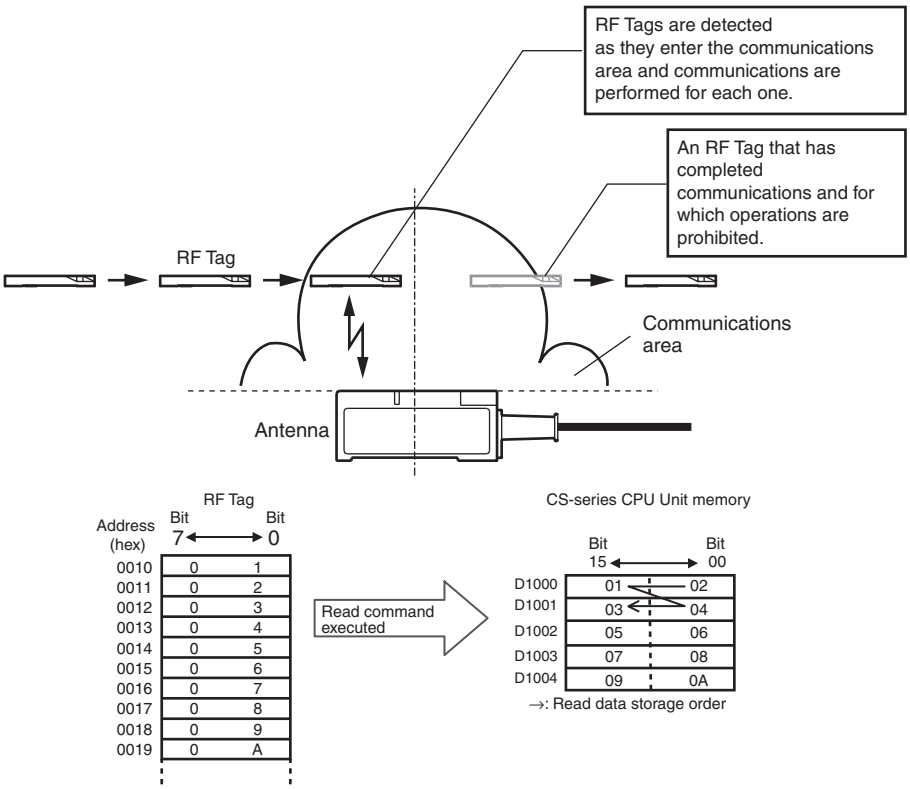



- If communications with the RF Tag fail or an error occurs, communications will be aborted at that point, the error flags in the Results Information (CIO n+8) will turn ON accordingly, and the error code will be placed in the Processing Results Monitor (CIO n+9). The previous read data will not be changed.
- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Read, Communications Specification: FIFO Repeat

## • Outline

This example shows how to repeatedly read the memory of RF Tags as they enter the communications area for Antenna 1.


RF Tags are detected as they enter the communications area and communications are performed for each one.
An RF Tag that has completed communications and for which operations are prohibited.
RF Tag
Communications area
Antenna
RF Tag
Address (hex)
Bit 7 ← → Bit 0
0010 0 1
0011 0 2
0012 0 3
0013 0 4
0014 0 5
0015 0 6
0016 0 7
0017 0 8
0018 0 9
0019 0 A
Read command executed
CS-series CPU Unit memory
Bit 15 ← → Bit 00
D1000 01 02
D1001 03 04
D1002 05 06
D1003 07 08
D1004 09 0A
→: Read data storage order

## • Unit Settings Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 00 | Unit's front panel unit number switches: 00 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | 15 s | |
| Command | Read | Set in the Special I/O Unit Area. |
| Communications specification | FIFO repeat | |
| Read data storage order | Leftmost → Rightmost | |
| Read Start address | 0010 hex | |
| Number of bytes to read | 10 bytes | |
| Read data storage destination | D1000 to D1004 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20001 | 0150 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

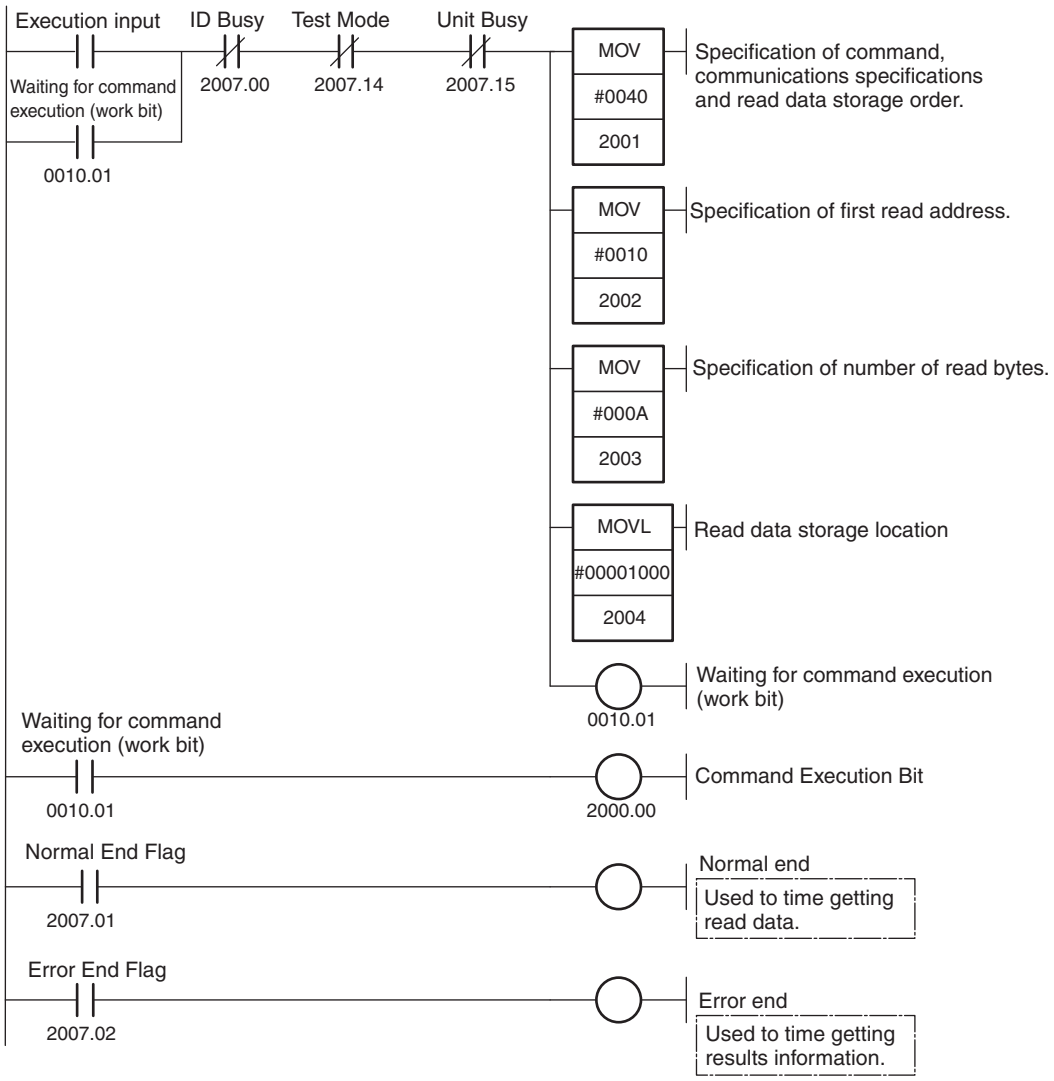
First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 0) = CIO 2000

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0 | 0 | 4 | 0 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 | | 10 | | First read address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 | | 0A | | Number of read bytes | | | | | | | | | | | | | | | |
| CIO 2004 | 10 | | 00 | | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 | 0 | 00 | | Data storage area | | | | Bank specification (Always 0) | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2006 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

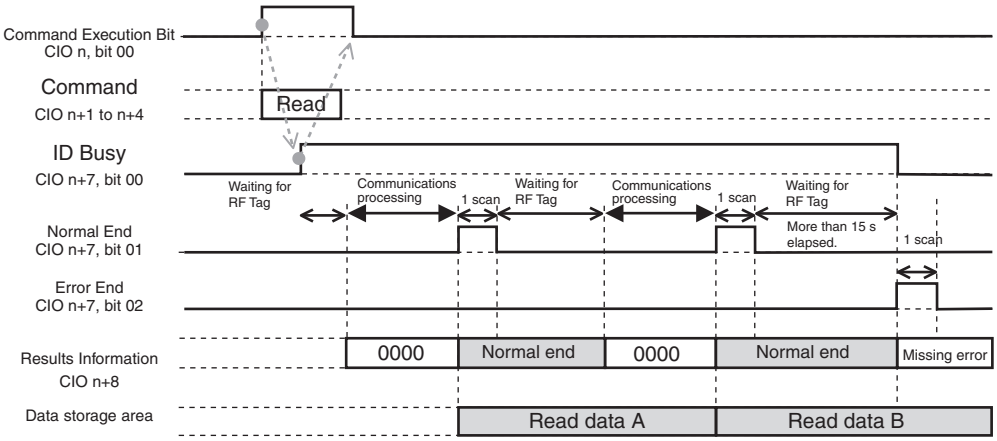
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV and MOVL instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON. Read data can be used after the Normal End Flag (CIO n+7, bit 01) has been ON.
To end command execution while waiting for the RF Tag, turn ON the Abort Input.



## • Timing Chart (CIO n = CIO 2000 + (10 x 0) = CIO 2000)



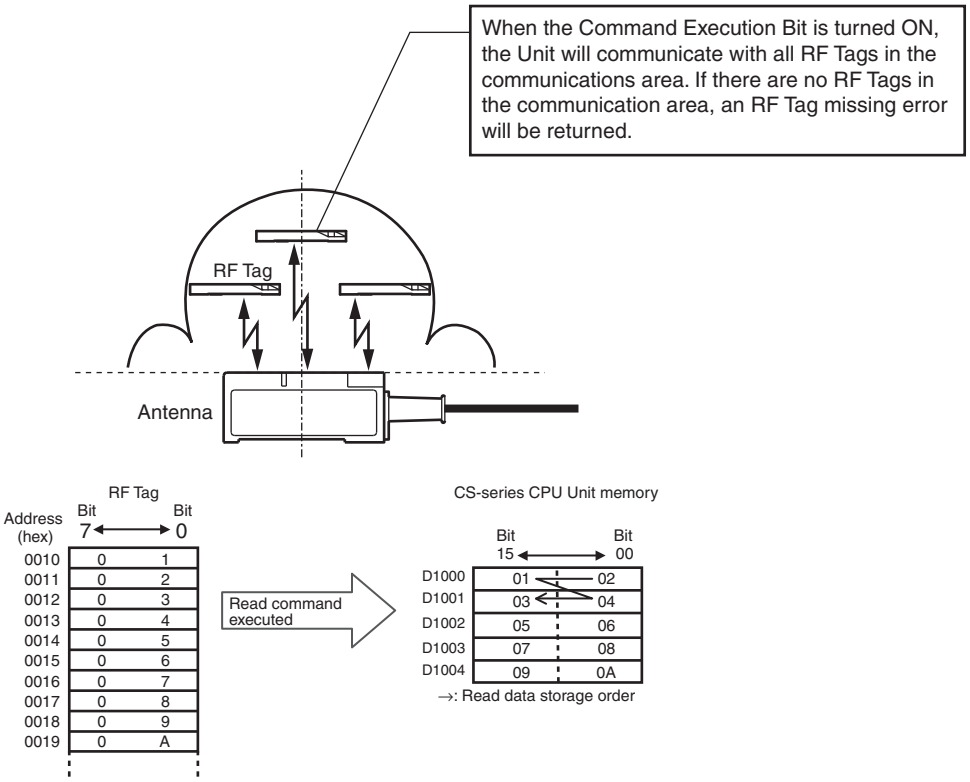

- If communications with the RF Tag fail or an error occurs, communications will be aborted at that point, the error flags in the Results Information (CIO n+8) will turn ON accordingly, and the error code will be placed in the Processing Results Monitor (CIO n+9). The previous read data will not be changed.
- If an auto wait time is set and the set time expires while waiting for an RF Tag, the command operation will be aborted at that point, the RF Tag Missing Error Flag (CIO n+8, bit 10) in the Results Information will turn ON, and an error code will be placed in the Processing Results Monitor (CIO n+9).
- When the communications specification is set to repeat auto, either the Normal End Flag or the Error End Flag will turn ON every scan for consecutive scans. The execution results can be correctly determined by using the ON status of both the Normal End Flag and the Error End Flag in Unit Status.

- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Read, Communications Specification: Multi-access Trigger

## • Outline

This example shows how to read the memory of all RF Tags present in the communications area for Antenna 1.


When the Command Execution Bit is turned ON, the Unit will communicate with all RF Tags in the communications area. If there are no RF Tags in the communication area, an RF Tag missing error will be returned.
RF Tag
Antenna
RF Tag
Address (hex)
Bit 7
Bit 0
0010 0 1
0011 0 2
0012 0 3
0013 0 4
0014 0 5
0015 0 6
0016 0 7
0017 0 8
0018 0 9
0019 0 A
Read command executed
CS-series CPU Unit memory
Bit 15
Bit 00
D1000 01 02
D1001 03 04
D1002 05 06
D1003 07 08
D1004 09 0A
→: Read data storage order

## • Unit Setting Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 00 | Unit's front panel unit number switches: 00 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | Infinite | |
| Command | Read | Set in the Special I/O Unit Area. |
| Communications specification | Multi-access trigger | |
| Read data storage order | Leftmost → Rightmost | |
| Read Start address | 0010 hex | |
| Number of bytes to read | 10 bytes | |
| Read data storage destination | D1000 to D1004 | |

CHECK!

When communications with the RF Tags have been completed, the ID Sensor Unit sends the response sequentially. Move the result data stored in the data storage area to another area before the data from the next RF Tag is stored.

First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20001 | 0000 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

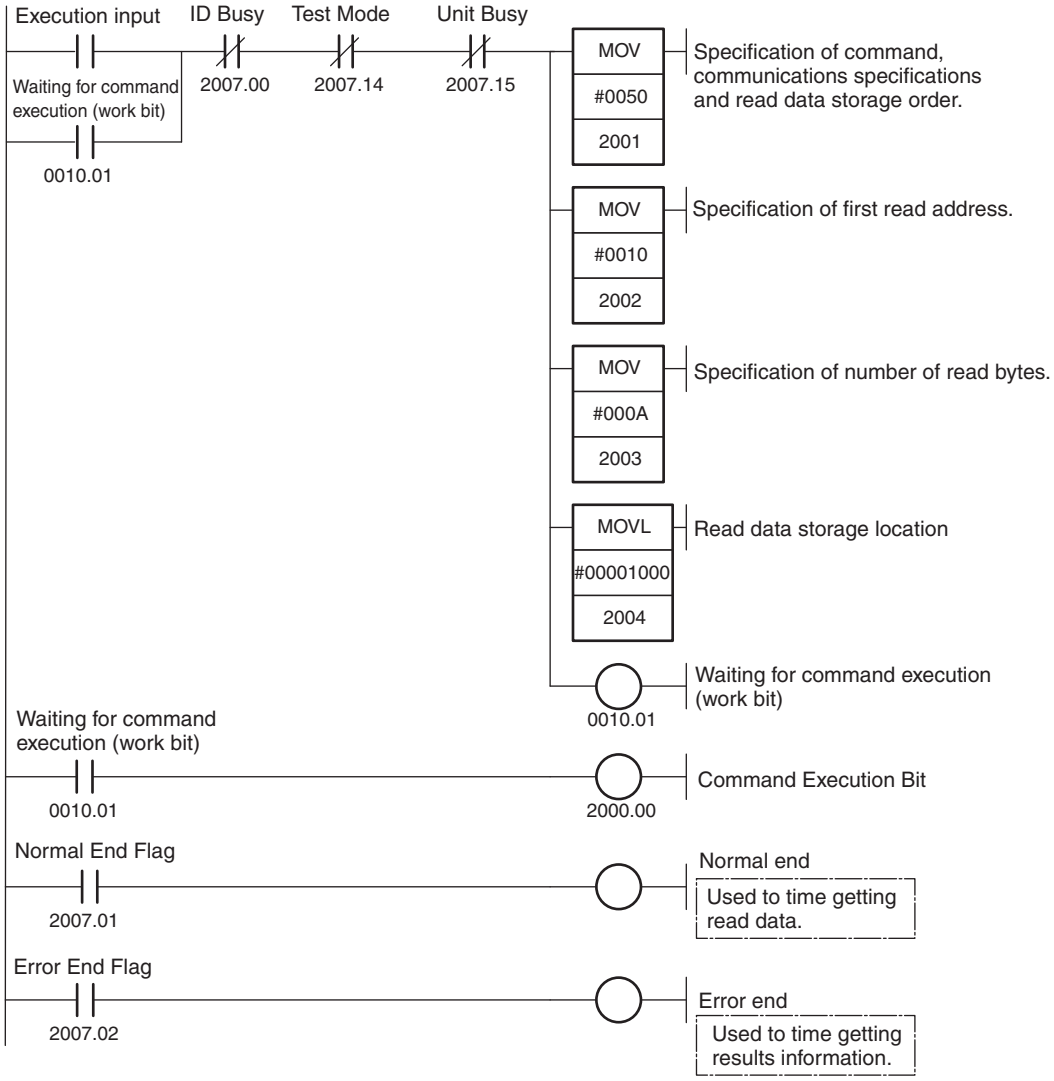
First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 0) = CIO 2000

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0 | 0 | 5 | 0 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 | | 10 | | First write address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 | | 0A | | Number of write bytes | | | | | | | | | | | | | | | |
| CIO 2004 | 10 | | 00 | | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 | 0 | 00 | | Data storage area | | | | Bank specification (Always 0) | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2006 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

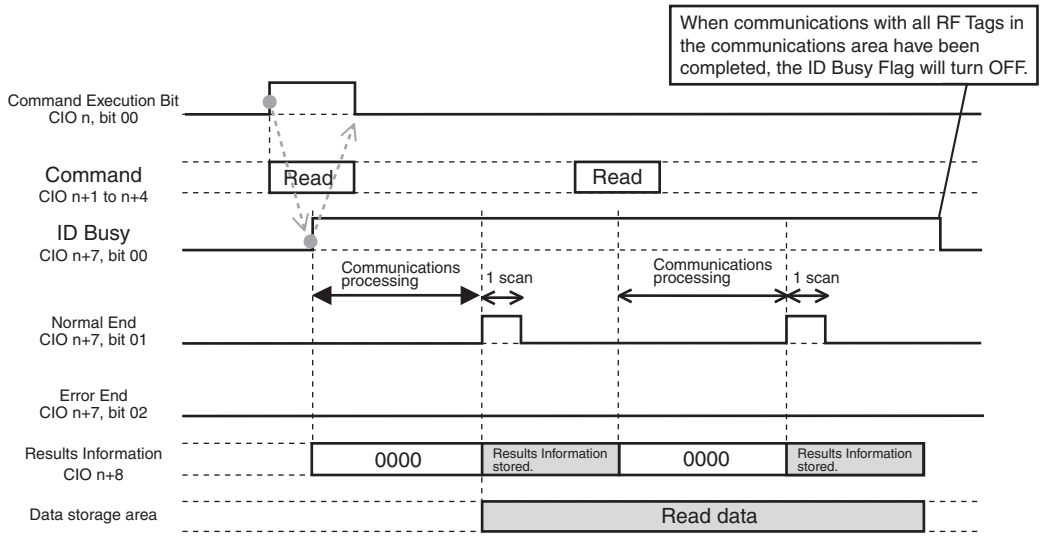
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV and MOVL instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON. Read data can be used after the Normal End Flag (CIO n+7, bit 01) has been ON.
To end command execution while waiting for the RF Tag, turn ON the Abort Input.



## • Timing Chart (CIO n = CIO 2000 + (10 x 0) = CIO 2000)

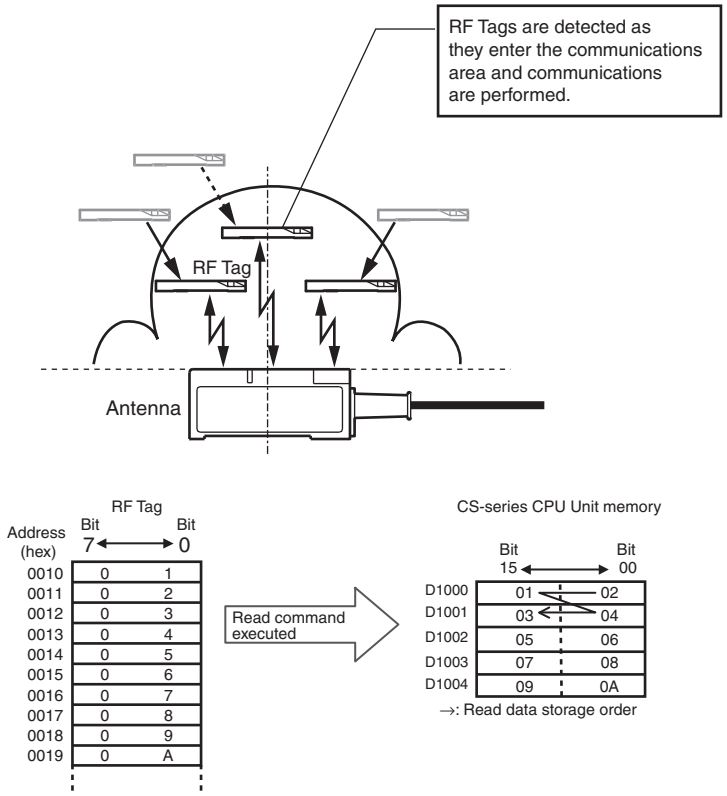



- If communications with the RF Tag fail or an error occurs, communications will be aborted at that point, the error flags in the Results Information (CIO n+8) will turn ON accordingly, and the error code will be placed in the Processing Results Monitor (CIO n+9). The previous read data will not be changed.
- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Read, Communications Specification: Multi-access Repeat

## • Outline

This example shows how to repeatedly read the memory of RF Tags as they enter the communications area for Antenna 1.




## • Unit Settings Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 00 | Unit's front panel unit number switches: 00 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | 15 s | |
| Command | Read | Set in the Special I/O Unit Area. |
| Communications specification | Multi-access repeat | |
| Read data storage order | Leftmost → Rightmost | |
| Read Start address | 0010 hex | |
| Number of bytes to read | 10 bytes | |
| Read data storage destination | D1000 to D1004 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20001 | 0150 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

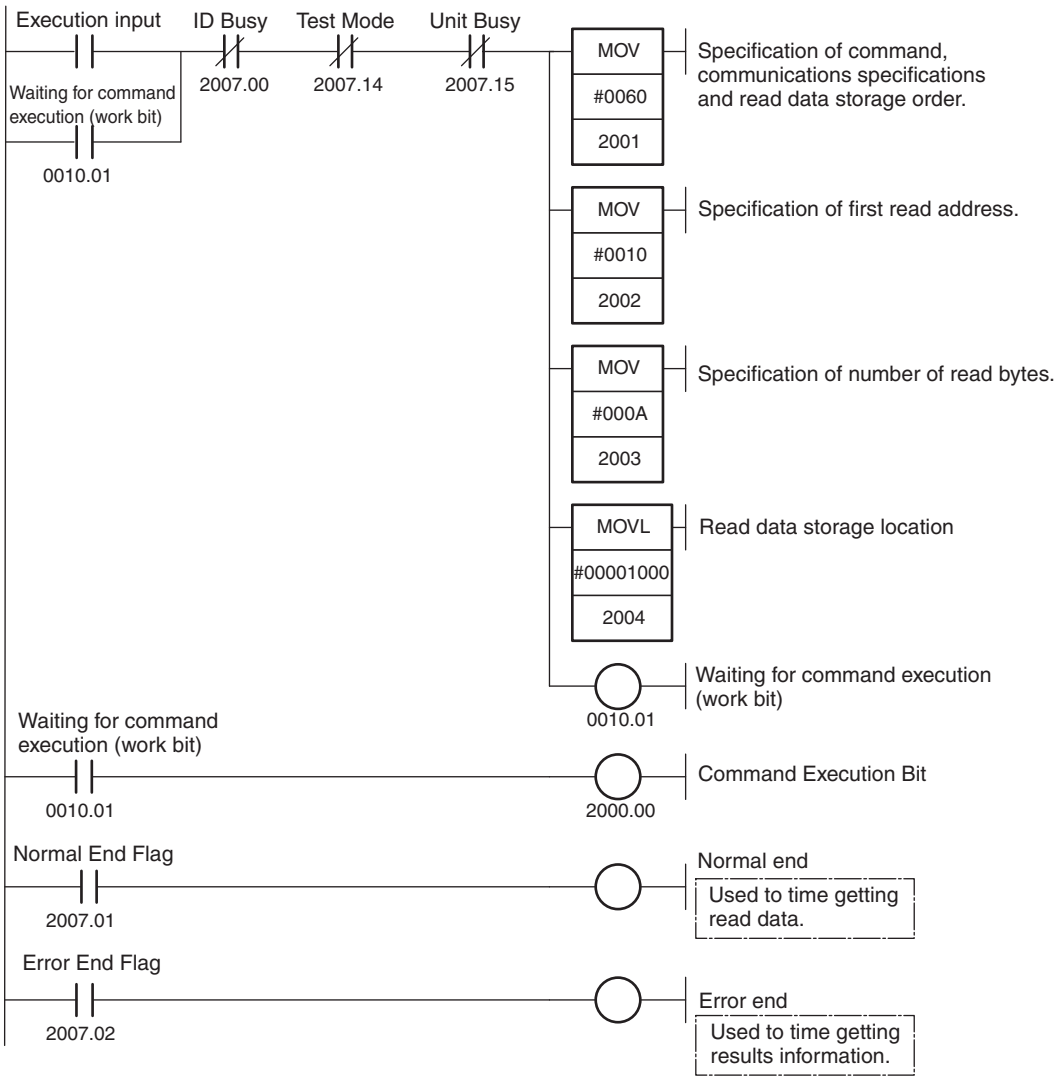
First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 0) = CIO 2000

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 0 | 0 | 6 | 0 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 | | 10 | | First write address | | | | | | | | | | | | | | | |
| CIO 2003 | 00 | | 0A | | Number of write bytes | | | | | | | | | | | | | | | |
| CIO 2004 | 10 | | 00 | | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2005 | 0 | 0 | 00 | | Data storage area | | | | Bank specification (Always 0) | | | | Read data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2006 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

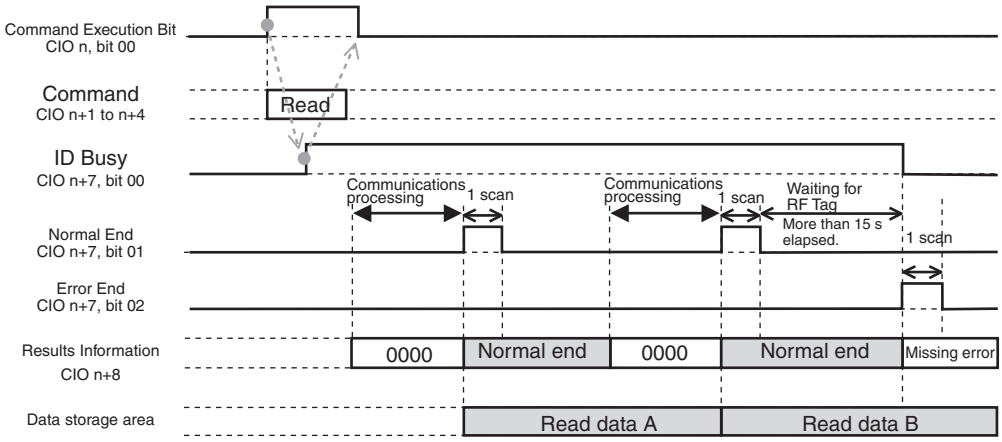
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV and MOVL instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON. Read data can be used after the Normal End Flag (CIO n+7, bit 01) has been ON.
To end command execution while waiting for the RF Tag, turn ON the Abort Input.



## • Timing Chart (CIO n = CIO 2000 + (10 x 0) = CIO 2000)



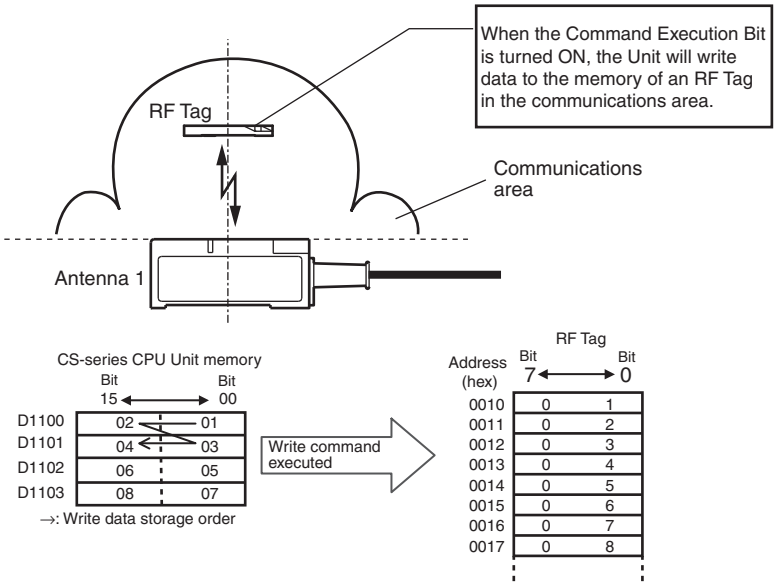

- If communications with the RF Tag fail or an error occurs, communications will be aborted at that point, the error flags in the Results Information (CIO n+8) will turn ON accordingly, and the error code will be placed in the Processing Results Monitor (CIO n+9). The previous read data will not be changed.
- If an auto wait time is set and the set time expires while waiting for an RF Tag, the command operation will be aborted at that point, the RF Tag Missing Error Flag (CIO n+8, bit 10) in the Results Information will turn ON, and an error code will be placed in the Processing Results Monitor (CIO n+9).
- When the communications specification is set to repeat auto, either the Normal End Flag or the Error End Flag will turn ON every scan for consecutive scans. The execution results can be correctly determined by using the ON status of both the Normal End Flag and the Error End Flag in Unit Status.

- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Write, Communications Specification: Trigger

## ■ Outline

This example shows how to write data to the memory of an RF Tag in the communications area of Antenna 1.




## ■ Unit Settings Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 55 | Unit's front panel unit number switches: 55 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode<br>Data transfer setting: Cyclic | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | Infinite | |
| Command | Write | Set in the Special I/O Unit Area. |
| Communications specification | Trigger | |
| Write data storage order | Rightmost → Leftmost | |
| Write Start address | 0010 hex | |
| Number of bytes to write | 8 bytes | |
| Write data storage destination | D1000 to D1004 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 55) = D25500

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D25500 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D25501 | 0000 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

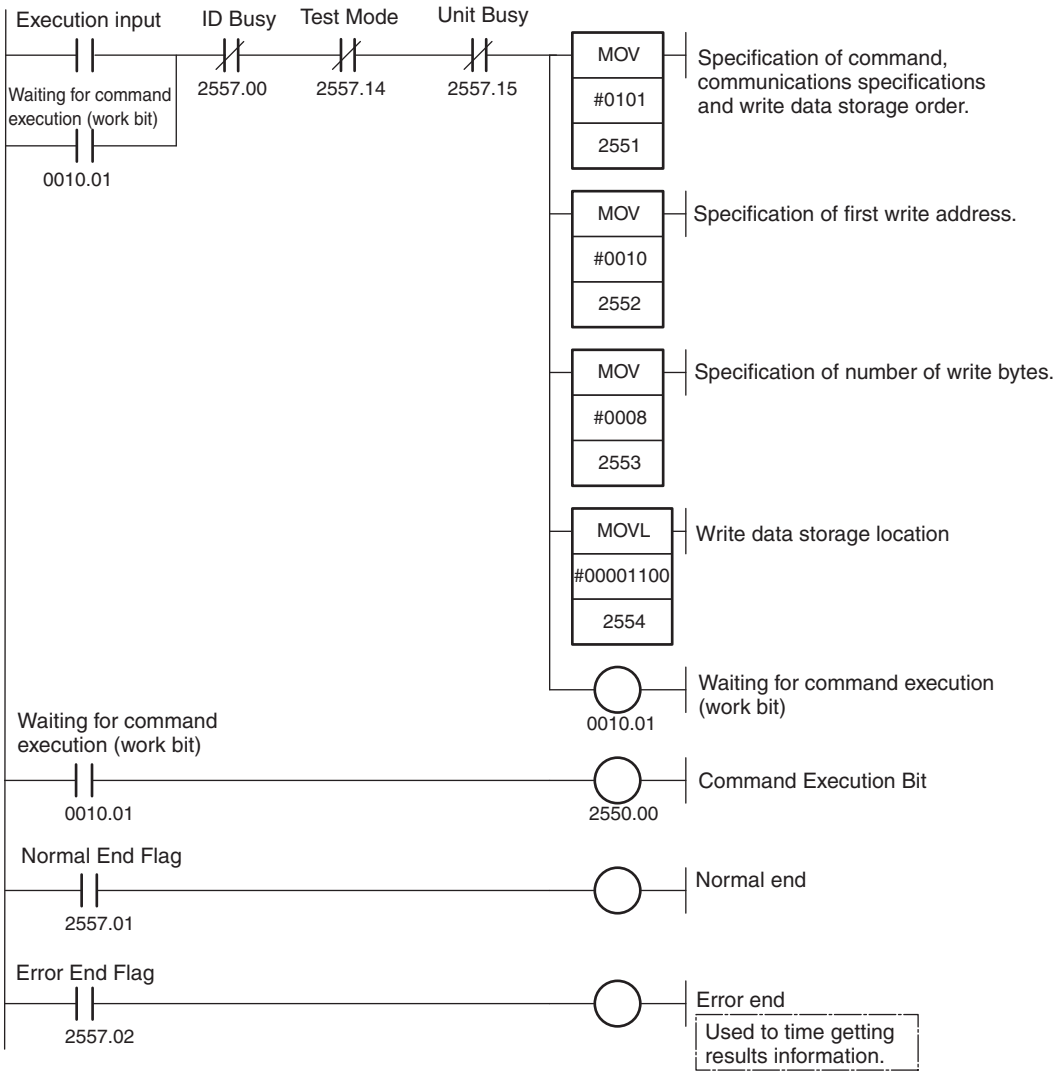
First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 55) = CIO 2550

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2551 | 01 | | 0 | 1 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2552 | 00 | | 10 | | First write address | | | | | | | | | | | | | | | |
| CIO 2553 | 00 | | 08 | | Number of write bytes | | | | | | | | | | | | | | | |
| CIO 2554 | 11 | | 00 | | Read data storage location (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2555 | 0 | 0 | 00 | | Data storage area | | | | Bank specification (Always 0) | | | | Write data storage location (leftmost 2 digits) | | | | | | | |
| CIO 2556 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |

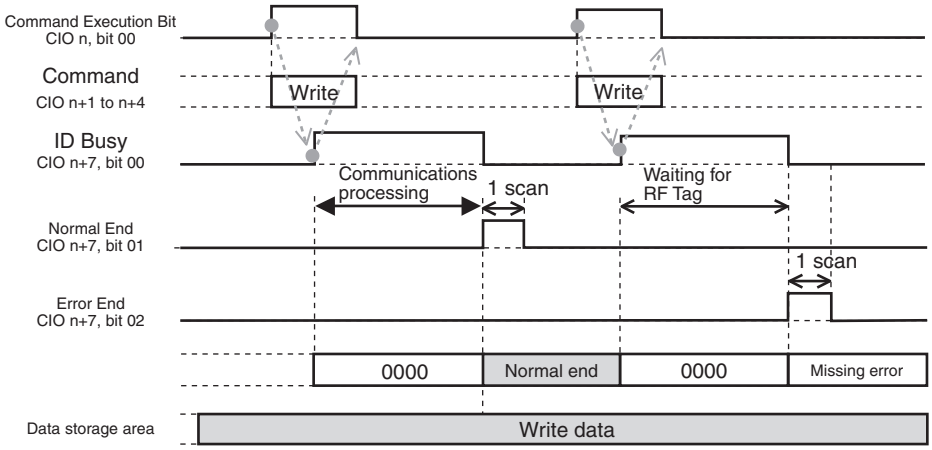
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV and MOVL instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON.



## • Timing Chart (CIO n = CIO 2000 + (10 x 55) = CIO 2550)

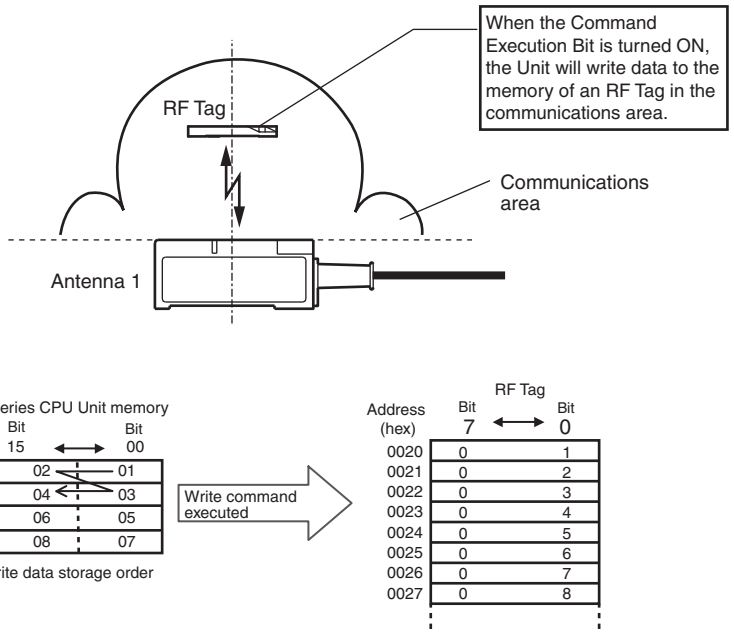



- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Write, Communications Specification: Trigger, Data Transfer: Intelligent I/O Instructions

## ■ Outline

This example shows how to write data to the memory of an RF Tag that is present in the communications area for Antenna 1.




## ■ Unit Settings Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 00 | Unit's front panel unit number switches: 00 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode<br>Data Transfer Setting: Intelligent I/O Instructions | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | Infinite | |
| Command | Write | Set in the Special I/O Unit Area. |
| Communications specification | Trigger | |
| Write data storage order | Rightmost → Leftmost | |
| Write Start address | 0020 hex | |
| Number of bytes to write | 512 bytes | Set in IOWR instruction. |
| Write data storage destination | D20920 to D21431 | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 0) = D20000

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D20000 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D20001 | 0000 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |
| D20090 | 0001 | | | | Data Transfer Setting | | | | | | | | | | | | | | | |

First word allocated to Unit in CIO Area: n = CIO 2000 + (10 × 0) = CIO 2000

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2001 | 01 | | 0 | 1 | Command code | | | | | | | | Communications specification | | | | Data order | | | |
| CIO 2002 | 00 | 20 | | | Write start address | | | | | | | | | | | | | | | |
| CIO 2003 | 02 | 00 | | | Number of bytes to write | | | | | | | | | | | | | | | |
| CIO 2004 | 00 | 00 | | | --- | | | | | | | | | | | | | | | |
| CIO 2005 | 0 | 0 | 00 | | --- | | | | | | | | | | | | | | | |
| CIO 2006 | 00 | 00 | | | --- | | | | | | | | | | | | | | | |

---: Ignored.

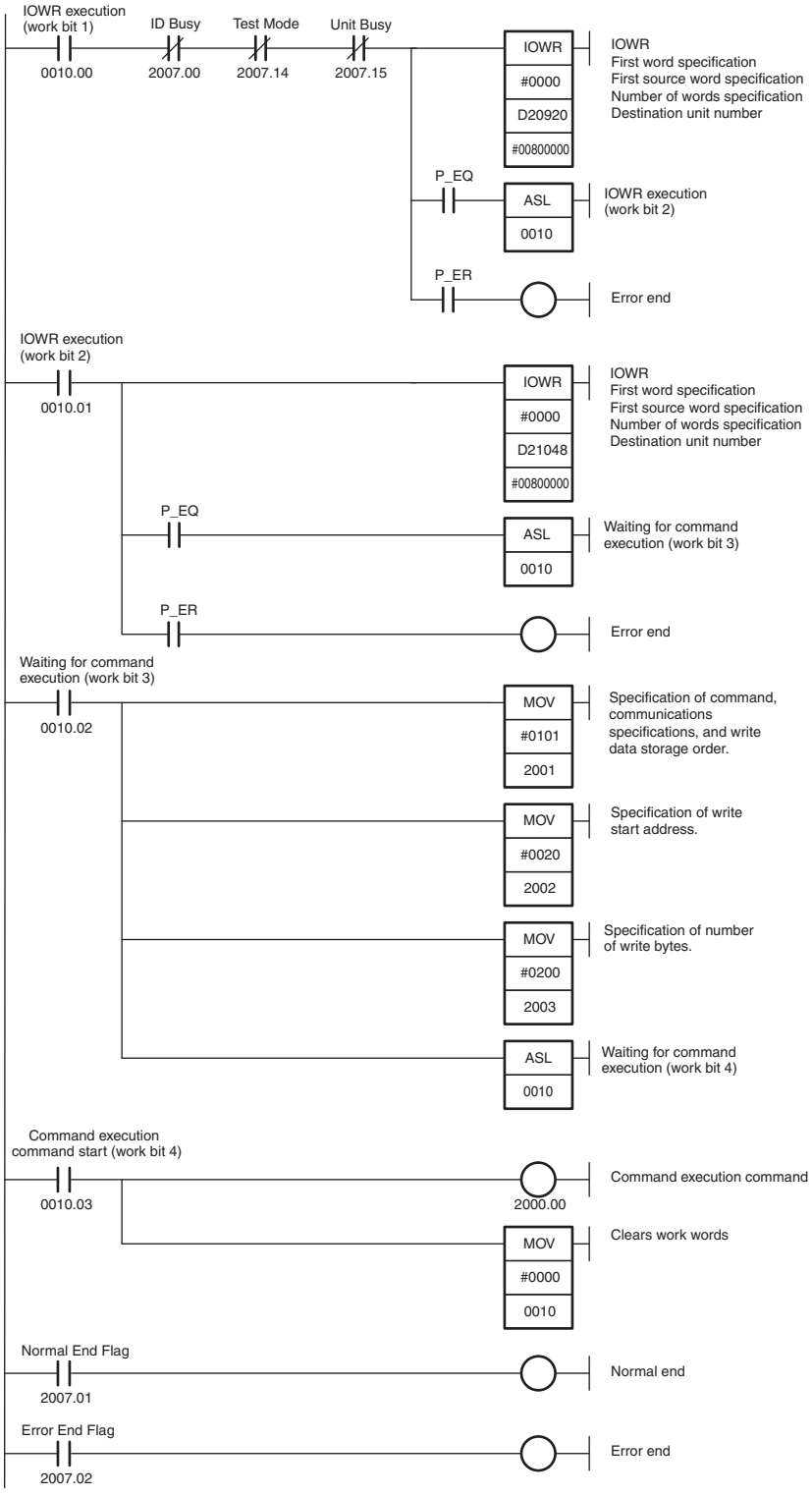
## • Programming Example

Execute the IOWR instruction before starting execution of the write command.

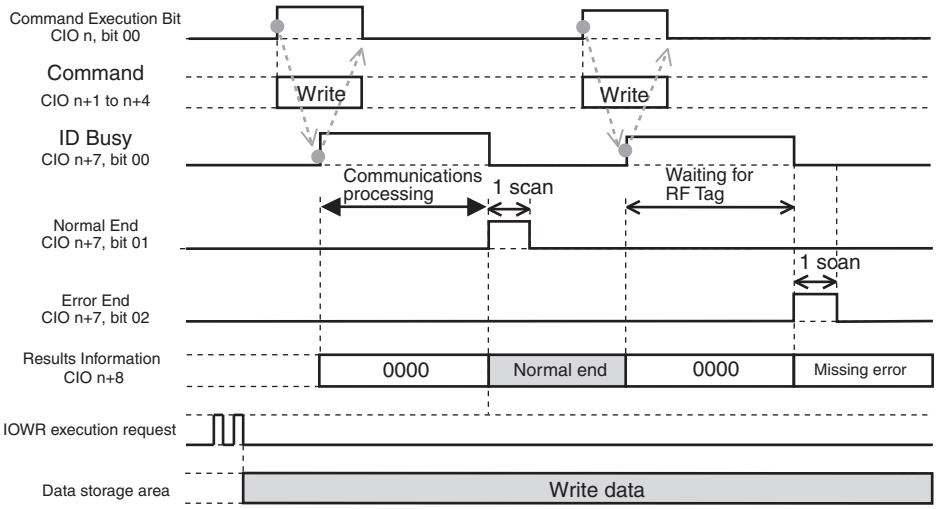
When the command execution input turns ON, settings are made in the Special I/O Unit Area using MOV instructions and the command is executed. When communications with the RF Tag have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON.

The following ladder programming uses the Write command and the IOWR instruction to write 512 bytes of data.

The IOWR instruction is executed twice to write 256 bytes (128 words) each time.



## • Timing Chart (CIO n = CIO 2000 + (10 x 55) = CIO 2550)

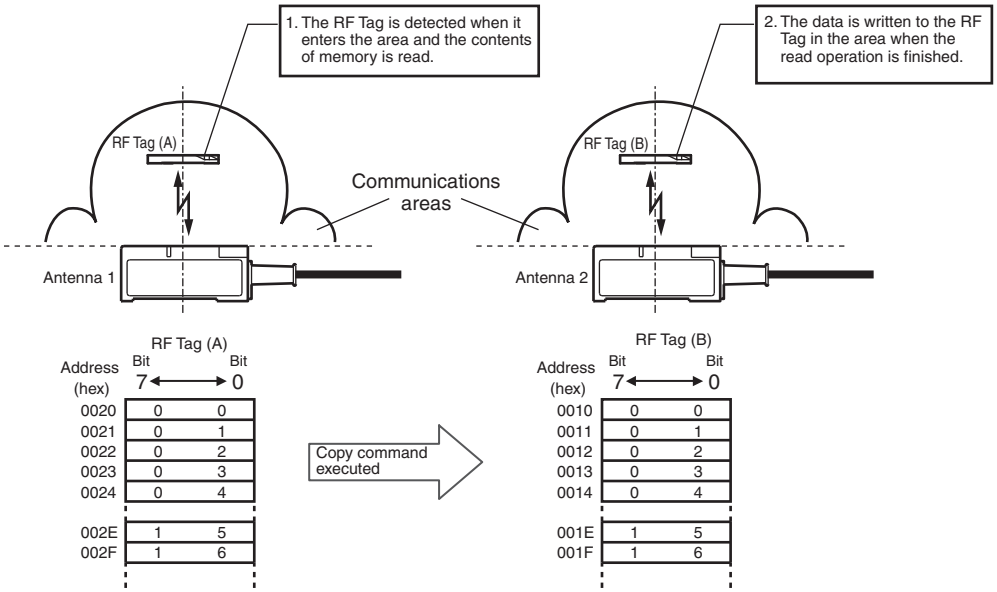



- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag. These flags show the Unit status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.
- Execute the IOWR instruction before executing the write command.

# Copy, Communications Specification: Single Auto

## • Outline

This example shows how to read data from the memory of an RF Tag A when it enters the communications area for Antenna 1 and then write the data to RF Tag B in the communications area for Antenna 2.


1. The RF Tag is detected when it enters the area and the contents of memory is read.
2. The data is written to the RF Tag in the area when the read operation is finished.
RF Tag (A)
RF Tag (B)
Communications areas
Antenna 1
Antenna 2
RF Tag (A)
Address (hex)
Bit 7 → 0 Bit
0020 0 0
0021 0 1
0022 0 2
0023 0 3
0024 0 4
002E 1 5
002F 1 6
Copy command executed
RF Tag (B)
Address (hex)
Bit 7 → 0 Bit
0010 0 0
0011 0 1
0012 0 2
0013 0 3
0014 0 4
001E 1 5
001F 1 6

## • Unit Setting Example

| Item | Setting | Setting location |
|---|---|---|
| Unit number | 77 | Unit's front panel unit number switches: 77 |
| Operating mode | Run Mode | Unit's front panel test switch: OFF |
| System Settings | UID Addition Setting: Disabled<br>Test Mode Disable Setting: Enabled<br>Setting for Write Verification: Verification<br>RF Tag Communications Speed Setting: Normal Mode | Set in the Special I/O Unit words in DM Area. |
| Auto Wait Time Setting | Infinite | |
| Command | Copy | Set in the Special I/O Unit Area. |
| Communications specification | Trigger | |
| Read start address | 0020 hex | |
| Number of read/write bytes | 16 bytes | |
| Write start address | 0010 hex | |

First word allocated to Unit in DM Area: m = D20000 + (100 × 77) = D27700

| DM address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D27700 | 0 | 0 | 0 | 0 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | RF Tag Communications Speed Setting | | | |
| D27701 | 0000 | | | | Auto Wait Time Setting | | | | | | | | | | | | | | | |

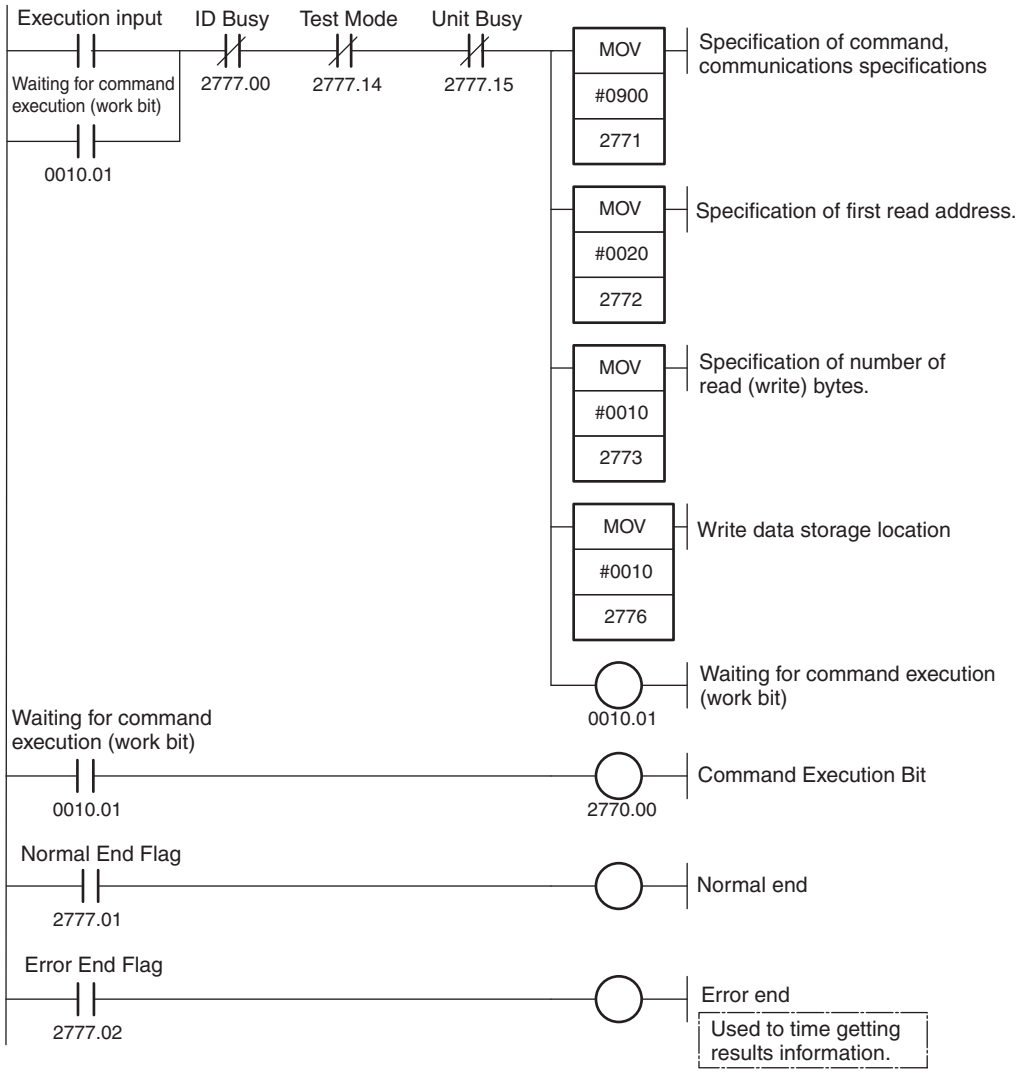
First Word Allocated to Unit in CIO Area: n = CIO 2000 + (10 × 77) = CIO 2770

| Word address | Contents | | | | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2771 | 09 | | 0 | 0 | Command code | | | | | | | | Communications specification | | | | --- | | | |
| CIO 2772 | 00 | | 20 | | First processing address | | | | | | | | | | | | | | | |
| CIO 2773 | 00 | | 10 | | Number of processing bytes | | | | | | | | | | | | | | | |
| CIO 2774 | 00 | | 00 | | --- | | | | | | | | | | | | | | | |
| CIO 2775 | 0 | 0 | 00 | | --- | | | | --- | | | | --- | | | | | | | |
| CIO 2776 | 00 | | 10 | | Command option | | | | | | | | | | | | | | | |

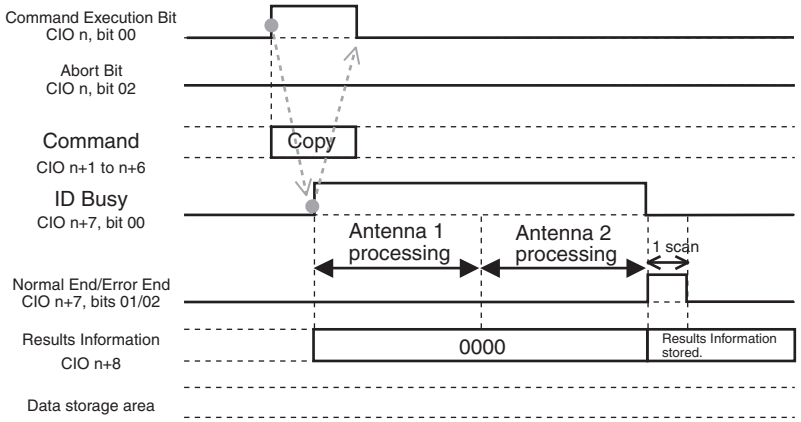
---: Ignored.

## • Programming Example

When the execution input turns ON, settings are made in the Special I/O Unit Area using the MOV instruction and the command is executed. Data is read from the memory of RF Tag A and written to the memory of RF Tag B. When communications with RF Tag B have been completed, the Normal End Flag (CIO n+7, bit 01) or Error End Flag (CIO n+7, bit 02) is turned ON.



**• Timing Chart (CIO n = CIO 2000 + (10 × 77) = CIO 2770)**




- To confirm the execution results from the user program, use the ON status of the Normal End Flag or Error End Flag in the Unit Status.
- Do not turn ON the Command Execution Bit during command execution (i.e., while the ID Busy Flag is ON). It will be ignored.

# Data Coding Tables

## Special I/O Unit Words Allocated in DM Area

First word allocated to Antenna 1: m = D20000 + (100 × Unit number)

First word allocated to Antenna 2: m = D20000 + (100 × (Unit number + 1))

### ■ System Settings: DM m (= D2□□00)

| DM address | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D2□□00 | UID Addition Setting | | | | Test Mode Disable Setting | | | | Setting for Write Verification | | | | Tag Communications Speed Setting | | | |

| UID Addition Setting (BCD) | Test Mode Disable Setting (BCD) | Setting for Write Verification (BCD) | Tag Communications Speed Setting (BCD) |
|---|---|---|---|
| 0: Disabled<br>1: Enabled | 0: Enabled<br>1: Disabled | 0: Verification<br>1: No verification | 0: Normal Mode<br>1: High-speed Mode |

### ■ Auto Wait Time Setting: DM m+1 (= D2□□01)

| DM address | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| D2□□01 | Auto Wait Time Setting | | | | | | | | | | | | | | | |

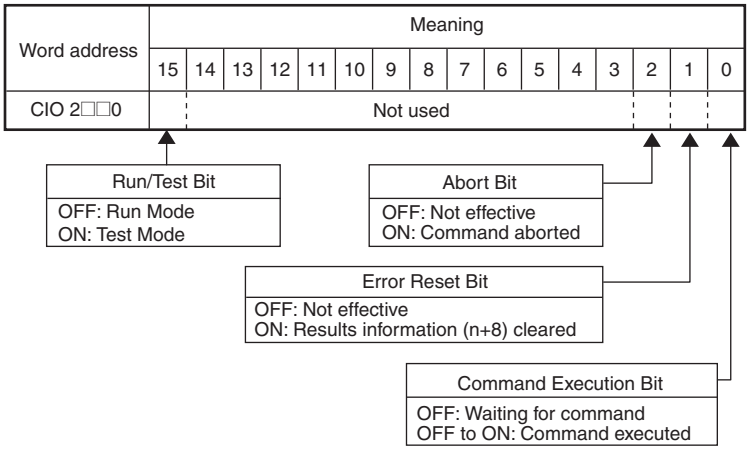
| Auto Wait Time Setting |
|---|
| 0000: Infinity (not monitored)<br>0001 to 9999 (hex) × 0.1 s |

# Words Allocated in Special I/O Unit Area in CIO Area

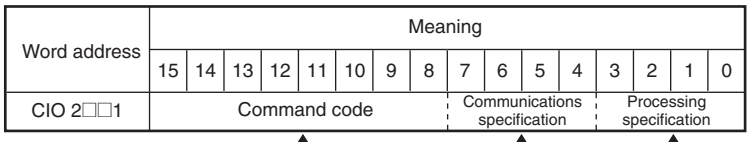
First word allocated to Antenna 1: n = CIO 2000 + (10 × Unit number)

First word allocated to Antenna 2: n = CIO 2000 + (10 × (Unit number + 1))

## ■ Unit Controls: CIO n (= CIO 2□□0)




## ■ Command: Words (CIO n+1) to (CIO n+3) (= CIO 2□□1 to CIO 2□□3)




| Com spec (BCD) | Applicable command |
|---|---|
| 00 | Read |
| 01 | Write |
| 02 | Bit Set |
| 03 | Bit Clear |
| 04 | Mask Bit Write |
| 05 | Calculation Write |
| 06 | Data Fill |
| 07 | Data Check |
| 08 | No. of Write Control |
| 09 | Copy |
| 0A | Read with Error Correction |
| 0B | Write with Error Correction |
| 0C | UID Read |
| 10 | Noise Measurement |

| Command code (BCD) | Applicable command |
|---|---|
| 0: Trigger | Read |
| 1: Auto | Write |
| 2: Repeat auto | Bit Set |
| 3: FIFO Trigger | Bit Clear |
| 4: FIFO Repeat | Mask Bit Write |
| 5: Multi-access trigger | Calculation Write |
| 6: Multi-access repeat | Data Fill |
| | Read with Error Correction |
| | Write with Error Correction |
| | UID Read |
| 0: Trigger | Data Check |
| 1: Auto | No. of Write Control |
| | Copy |
| ---: Noise Measurement | Noise Measurement |

| Proc spec (BCD) | Applicable command |
|---|---|
| Data storage order<br>0: Leftmost to rightmost<br>1: Rightmost to leftmost | Read |
| | Write |
| | Bit Set |
| | Bit Clear |
| | Mask Bit Write |
| | Read with Error Correction |
| | Write with Error Correction |
| | UID Read |
| 0: Add<br>1: Subtract | Calculation Write |
| 0: Bytes<br>1: Words | Data Fill |
| 0: Calculate<br>1: Verify | Data Check |
| 0: Add<br>1: Subtract | No. of Write Control |
| --- | Copy |
| | Noise Measurement |

---: Undefined (No setting required)

| Word address | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2□□2 | Processing address | | | | | | | | | | | | | | | |
| CIO 2□□3 | Number of bytes to process | | | | | | | | | | | | | | | |

| No.of bytes (hex) | Applicable command |
|---|---|
| 0001 to 0800 | Read |
| | Write |
| 0001 to 0004 | Bit Set |
| | Bit Clear |
| --- | Mask Bit Write |
| 0001 to 0004 | Calculation Write |
| 0000 (All)<br>0001 to 0800 | Data Fill |
| 0003 to 0800 | Data Check |
| --- | No. of Write Control |
| 0001 to 0800 | Copy |
| 0001 to 01FE | Read with Error Correction |
| | Write with Error Correction |
| --- | UID Read |
| --- | Noise Measurement |

---: Undefined (No setting required)

| Processing address (hex) | Applicable command |
|---|---|
| 0000 to FFFF (Settable addresses depend on ID Tag.) | Read |
| | Write |
| | Bit Set |
| | Bit Clear |
| | Mask Bit Write |
| | Calculation Write |
| | Data Fill |
| 0000 to FFFD | Data Check |
| | No. of Write Control |
| Read Address 0000 to FFFF | Copy |
| 00000 to FFFA (See note.) | Read with Error Correction |
| | Write with Error Correction |
| --- | UID Read |
| --- | Noise Measurement |

---: Undefined (No setting required)

**Note:** The range of addresses that can be set depends on the RF Tag.

## ■ Data Storage Area: Words (CIO n+4) to (CIO n+5) (= CIO 2□□4 to CIO 2□□5)

| Word address | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2□□4 | Data storage word (rightmost 4 digits) | | | | | | | | | | | | | | | |
| CIO 2□□5 | Data storage area | | | Bank No. | | | | Data storage word (leftmost 2 digits) | | | | | | | | |

| Setting (hex) | Applicable Area |
|---|---|
| 0 | DM |
| 1 | CIO |
| 2 | WR |
| 3 | HR |
| 4 | AR |
| 5 | EM |
| 6 | TIM |
| 7 | CNT |

| Bank No. (hex) | Applicable area |
|---|---|
| 0 | DM |
| | CIO |
| | WR |
| | HR |
| | AR |
| 0 to C | EM |
| 0 | TIM |
| | CNT |

| Leftmost 2 digits (BCD) | Rightmost 4 digits (BCD) | Applicable area |
|---|---|---|
| 000000 to 032767 | | DM |
| 000000 to 006143 | | CIO |
| 000000 to 000511 | | WR |
| 000000 to 000511 | | HR |
| 000000 to 000959 | | AR |
| 000000 to 032767 | | EM |
| 000000 to 004095 | | TIM |
| | | CNT |

## ■ Command Option: CIO n+6 (= CIO 2□□6)

| Word address | Meaning | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15 | 14 | 13 | 12 | 11 | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| CIO 2□□6 | Command option | | | | | | | | | | | | | | | |

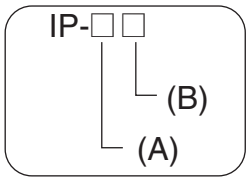
| Command option | Applicable command |
|---|---|
| --- | Read |
| | Write |
| | Bit Set |
| | Bit Clear |
| Mask specified data<br>0000 to FFFE | Mask Bit Write |
| Operation data<br>0000 to FFFF | Calculation Write |
| Fill data<br>0000 to FFFF | Data Fill |
| --- | Data Check |
| Number of writes<br>0000 to FFFF | No. of Writes Control |
| Write address<br>0000 to FFFF | Copy |
| --- | Read with Error Correction |
| | Write with Error Correction |
| | UID Read |
| --- | Noise Measurement |

---: Not defined (No setting necessary.)

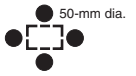
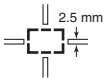
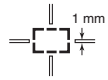
# Degree of Protection

IP-□□ degrees of protection given in this document were confirmed by OMRON based on the test conditions given below. Confirm satisfactory sealing performance in the actual operating environment and under the actual operating conditions before use.
IP = International Protection mark

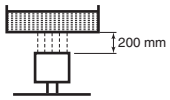
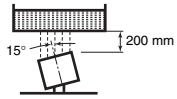
## ■ IEC (International Electrotechnical Commission) Standards (IEC60529: 1989-11)

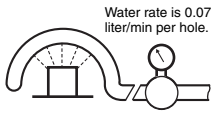
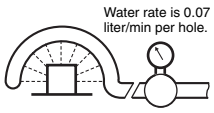
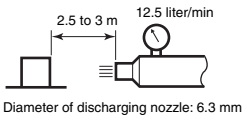
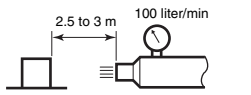
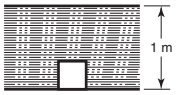



(A): First symbol: Degree of protection against solid materials

| Degree | Protection | |
|---|---|---|
| 0 | | No protection |
| 1 |   | Protects against penetration of any solid object such as a hand that is 50 mm or more in diameter. |
| 2 | | Protects against penetration of any solid object such as a finger that is 12.5 mm or more in diameter. Any object with a diameter of 12 mm, such as a finger, will not reach a hazardous part even if it penetrates 80 mm. |
| 3 |   | Protects against penetration of any solid object such as a wire that is 2.5 mm or more is diameter. |
| 4 |   | Protects against penetration of any solid object such as a wire that is 1 mm or more in diameter. |
| 5 | | Protects against penetration of dust of a quantity that may malfunction the protect or obstruct the safety operation of the product. |
| 6 | | Protects against penetration of all dust. |

(B): Second symbol: Degree of protection against water

| Degree | Protection | | Test method (with pure water) |
|---|---|---|---|
| 0 | No protection | Not protected against water. | No test |
| 1 | Protection against water drops | Protects against vertical drops of water towards the product. | Water is dropped vertically towards the product from the test machine for 10 min.   |
| 2 | Protection against water drops | Protects against drops of water approaching at a maximum angle of 15° to the left, right, back, and front of vertical towards the product. | Water is dropped for 2.5 min each (i.e., 10 min in total) towards the product inclined 15° to the left, right, back, and front from the test machine.   |

| Degree | Protection | | Test method (with pure water) |
|---|---|---|---|
| 3 | Protection against sprinkled water | Protects against sprinkled water approaching at a maximum angle of 60° from vertical towards the product. | Water is sprinkled at a maximum angle of 60° to the left and right from vertical for 10 min from the test machine.   |
| 4 | Protection against water spray | Protects against water spray approaching at any angle towards the product. | Water is sprayed at any angle towards the product for 10 min from the test machine.   |
| 5 | Protection against water jet spray | Protects against water jet spray approaching at any angle towards the product. | Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine.   |
| 6 | Protection against high-pressure water jet spray | Protects against high-pressure water jet spray approaching at any angle towards the product. | Water is jet sprayed at any angle towards the product for 1 min per square meter for at least 3 min in total from the test machine.   |
| 7 | Protection underwater | Resists the penetration of water when the product is placed underwater at specified pressure for a specified time. | The product is placed 1 m deep in water (if the product is 850 mm max. in height) for 30 min.   |
| 8 | Protection underwater | Can be used continuously underwater. | The test method is determined by the manufacturer and user. |

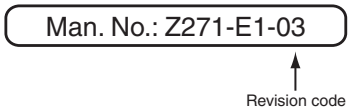
## ■ Oil resistance (OMRON in-house standard)

| Protection | |
|---|---|
| Oil-resistant | No adverse affect from oil drops or oil spray approaching from any direction. |
| Oil-proof | Protects against penetration of oil drops or oil spray approaching from any direction. |

**Note:** This OMRON in-house standard confirms resistance to cutting and other oils. It is equivalent to the former JEM standard.

# Revision History

A manual revision code appears as a suffix to the catalog number at the bottom of the front and rear pages.




| Revision code | Date | Revised contents |
|---|---|---|
| 01 | December 2007 | Original production |
| 02 | August 2010 | Added information for Heat-resistive RF Tags (V680-D1KP58HTN and V680-D1KP58HT).<br>Added information on RF Tag memory setting and data transfer setting.<br>Made other minor corrections. |
| 02A | December 2010 | Minor corrections (p.67, 95) |
| 02B | May 2011 | Minor corrections (p.150) |
| 03 | December 2011 | Added items for V680-D1KP52M-BT01, V680-D1KP52M-BT11, V680-D2KF52M-BT01, and V680-D2KF52M-BT11 RF Tag, and made other minor corrections. |

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